NE:COM

NEXCOM International Co., Ltd.

IoT Automation Solutions
Industrial Panel PC
IPPC A1770T and IPPC A1770P Series
User Manual

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PREFACE

Copyright

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Acknowledgements

The IPPC A1770T and IPPC A1770P series are trademarks of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

1. NEXCOM makes products in accordance with the Industry standard and, NEXCOM warrants that all her Industry-grade IPC and System products will be free from defect in neither material nor workmanship for twenty-four (24) months from the day of invoice issued.

2. For NEXCOM Panel PC product lines (the IPPC, APPC and MPPC series), they are also guaranteed against defect in materials and workmanship for the period of twenty-four (24) months in their motherboard design. For 3rd party parts, it follows with original suppliers' standard: 12 months for battery pack and LCD, 24 months for adaptor / add on modules (including GSM module, RFID module, and antenna).

3. If NEXCOM determines customer's warranty claim is valid, NEXCOM will repair or replace product(s) without additional charge for parts and labor. An extended Warranty Program will extend the warranty period of the product accordingly.

Warranty Coverage

The warranty applies only to products manufactured or distributed by NEXCOM and her subsidiaries. This warranty covers all the products/shipments except for:

1. Any claimed defect, products that have been repaired or modified by persons who have not been authorized by NEXCOM or, products which have been subjected to misuse, abuse, accident, improper installation, or usage not in accordance with the product instruction. NEXCOM assumes no liability as a consequence of such events under the term of this warranty.

One example is the replacement of Tablet's or Hand-held's LCD display due to scratching stains or other degradation; these will not be covered under this warranty.

2. Damages caused by customers' delivery/shipping of the product or, product failure resulted from electrical power/voltage shock, or, installation of parts/components which are not supplied/approved by NEXCOM in advance.

3. Third-party products:

   a. Software, such as the device drivers,

   b. External devices such as HDD, printer, scanner, mouse, LCD panel, battery, and so on,

   c. Accessory/parts that were not approved by NEXCOM and,

   d. Accessory/parts were added to products after they were shipped from NEXCOM.

Product will be treated as "Out of Warranty " if:

a. It expires the warranted 24 months period from the day it was purchased.

b. It had been altered by persons other than an authorized NEXCOM service person or, which have been subjected to misuse, abuse, accident, or improper installation.

c. It doesn't have the original NEXCOM Serial Number labeling for NEXCOM's warranty period identification or, tracking.

RMA that NEXCOM has determined not to be covered by the warranty will be charged the NEXCOM Standard Repair Fee for the repairing. If a RMA is determined to be not repairable, customer will be notified and product(s) may be returned to customer at their request; a minimum service fee may be charged however.

NEXCOM Return Merchandise Authorization (RMA) Procedure

For the RMA (Return Merchandise Authorization) shipment, customer is responsible for packaging and shipping the product to the designated NEXCOM service sites, with shipping charges prepaid by the customer. The original NEXCOM shipping box should be used whenever possible. NEXCOM shall pay for the return of the product to the customer's location. In case of expedited shipping request, an extra service charge shall be assessed and the customer is responsible for this extra return shipping charge.

1. Customers should enclose the "NEXCOM RMA Service Form" with the returned products.

2. Customers need to write down all the information related to the problem on the " NEXCOM RMA Service Form " when applying for the RMA service; information will help to understand the problem, including the fault description, on-screen messages, and pictures if possible.

3. Customers could send back the faulty product with or without the accessories and key parts such as the CPU and DIMM. If the key parts are included, please be noted clearly within the return form. NEXCOM takes no responsibility for the parts which are not listed in the return form.

4. Customers hold the responsibility to ensure that the packing of defective products is durable enough to be resistant against further damage due to the transportation; damage caused by transportation is treated as " Out of Warranty " under our Warranty specification.

5. RMA product(s) returned by NEXCOM to any location other than the customer registered delivery address will incur an extra shipping charge, the customer is responsible for paying the extra shipping charges, duties, and taxes of this shipment.

Product Repairing

1. NEXCOM will repair defective products covered under this limited warranty that are returned to NEXCOM; if products do prove to be defective, they will be repaired during their warranty period unless other warranty terms have been specified.

2. NEXCOM owns all parts removed from repaired products.

3. NEXCOM will use parts made by various manufacturers in performing the repair.

4. The repaired products will be warranted subjected to the original warranty coverage and period only.

5. For products returned as defective but, proved to be no defect/fault after the RMA process, NEXCOM reserves the right to claim for a NDF (No Defect Found) Service Charge.

6. NEXCOM will issue RMA Report which included Repair Detailed Information to the customer when the defective products were repaired and returned.

7. In addition to the above, NEXCOM may authorize Independent/Third-party suppliers to repair the defective products for NEXCOM.

Out Of Warranty Service

There will be a service charge from NEXCOM for the "Out Of Warranty" product service; they are the Basic Diagnostic Service Fee and the Advanced Component Replacement Fee respectively. And, if the product can not be repaired, NEXCOM will either return the product to the customer or, just scrap it, followed by customer's instruction.

1. Testing and Parts Replacement

   NEXCOM will have the following Handling Charges for those OoW products that returned:

   a. Basic Labor Cost and Testing Fee: as Table listed.

   b. Parts Fee: NEXCOM will charge for main IC chipsets such as the N.B., S.B., Super-IO, LAN, Sound, Memory, and so on.

   c. 3rd-party Device Fee: products replacement for CPU, DIMM, HDD, Chassis, and UPS.

2. Out of Warranty product will have a three months warranty for the fixed issues. If the product failed with different problem within 3 months, they will still incur the service charge of "Out of Warranty".

3. Out of Warranty "products will not be repaired without a signed PI from the customer, the agreement of the repair process.

   Add-on card, 3rd Party Device and board level repair cost higher than new product prices, customer can abandon to sign PI to repair and, please contact with sales to buy new products.

Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- Maximum surrounding air temperature should not exceed 50°C.
- For use in Pollution Degree 2 Environment.
- Follow all mounting guidelines and instructions on Chapter 3 of the manual.
- Suitable for mounting on the flat surface of Type 2 and Type 4X indoor use only enclosure.

Caution:
FOR USE IN A CONTROLLED ENVIRONMENT, REFER TO MANUAL FOR ENVIRONMENTAL CONDITIONS.

Attention:
POUR UTILISATION EN ATMOSPHERE CONTROLEE, CONSULTER LA NOTICE TECHNIQUE.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.

2. Keep this User Manual for later reference.

3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.

5. Keep this equipment away from humidity.

6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.

7. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.

8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.

9. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

10. All cautions and warnings on the equipment should be noted.

11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

12. Never pour any liquid into an opening. This may cause fire or electrical shock.

13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.

14. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.

15. Do not place heavy objects on the equipment.

16. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.

17. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   – Product name and serial number
   – Detailed information of the peripheral devices
   – Detailed information of the installed software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wordings of the error messages

Warning!
1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

3. CFast: Turn off the unit's power before inserting or removing a CFast storage card.

Conventions Used in this Manual

Warning:
Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

Safety Warning: This equipment is intended for installation in a Restricted Access Location only.

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Package Contents

Before continuing, verify that the package you received is complete. Your IPPC series package should have all the items listed in the table.

IPPC A1770TE2-DC

Item	Description	Qty
1	3-pin terminal block for DC power input	1
2	3-pin terminal block for remote power switch	1
3	CPU thermal pad	1
4	PS/2 Y cable	1
5	Driver CD	1
6	Screws for HDD/SSD	4
7	Plastic screw fixing kit for PCI/PCIe card	2
8	Resistive touch pen	1

IPPC A1770PE2-DC

Item	Description	Qty
1	3-pin terminal block for DC power input	1
2	3-pin terminal block for remote power switch	1
3	CPU thermal pad	1
4	PS/2 Y cable	1
5	Driver CD	1
6	Screws for HDD/SSD	4
7	Plastic screw fixing kit for PCI/PCIe card	2

IPPC A1770TE2-AC

Item	Description	Qty
1	3-pin terminal block for remote power switch	1
2	CPU thermal pad	1
3	PS/2 Y cable	1
4	Driver CD	1
5	Screws for HDD/SSD	8
6	Plastic screw fixing kit for PCI/PCIe card	2
7	Resistive touch pen	1

IPPC A1770PE2-AC

Item	Description	Qty
1	3-pin terminal block for remote power switch	1
2	CPU thermal pad	1
3	PS/2 Y cable	1
4	Driver CD	1
5	Screws for HDD/SSD	8
6	Plastic screw fixing kit for PCI/PCIe card	2

1. 3-pin terminal block for DC power input (P/N: 4NCPF00310X00)

2. 3-pin terminal block for remote power switch (P/N: 4NCPF00310X00)

3. CPU thermal pad (P/N: 5060200113X00)

4. PS/2 Y cable (P/N: 60233MK202X00)

5. Driver CD (P/N: 602DCD1175X00)

6. Screws for HDD/SSD (P/N: 50311F0326X00)

IPPC A1770TE2-DC/IPPC A1770PE2-DC   **IPPC A1770TE2-AC/IPPC A1770PE2-AC**

IPPC A1770T and IPPC A1770P Series User Manual

7. Plastic screw fixing kit for PCI/PCIe card (P/N: 50311P0001X00 and 50322P0002X00)

8. Resistive touch pen (P/N: 5070000020X00)

Note: Package contents may vary depending on your country region. Some items may be optional. Please contact your local distributor for more information.

Ordering Information

The following provides ordering information for the Industrial Panel PC series.

- **IPPC A1770TE2-DC (P/N: 10II1770T00X0)**
17" SXGA LED backlight fanless RTP touch panel PC, 2x COM, DC power input, and optional fieldbus module

- **IPPC A1770PE2-DC (P/N: 10II1770P00X0)**
17" SXGA LED backlight fanless P-CAP touch panel PC, 2x COM, DC power input, and optional fieldbus module

- **IPPC A1770TE2-AC (P/N: 10II1770T01X0)**
17" SXGA LED backlight fanless RTP touch panel PC, 2x COM, AC power input, and optional fieldbus module

- **IPPC A1770PE2-AC (P/N: 10II1770P01X0)**
17" SXGA LED backlight fanless P-CAP touch panel PC, 2x COM, AC power input, and optional fieldbus module

 IPPC A1770T and IPPC A1770P Series User Manual

CHAPTER 1: PRODUCT INTRODUCTION

IPPC A1770T/P Series
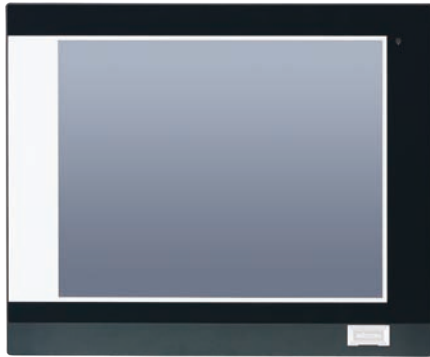
IPPC A1770T/P-DC

IPPC A1770T/P-AC

Key Features

- 4:3 17" SXGA Fanless Panel Computer

- Powerful 4th generation Intel® Core™ processor

- Two expansion slots for add-on PCI or/and PCIe cards

- Optional 3.5G/Wi-Fi module/2.5" HDD/2 x COM/GPIO/DIO/Dimming Control Button

- Front accessible USB 2.0 for easy of field maintenance

- Inside USB 2.0 type A connector for license key

- Metal housing with robust aluminum IP66 compliant front bezel for harsh environment

- Two FBI ports support fieldbus module, JMobile HMI and CODESYS (optional)

- Wide range 12V~30VDC power input for -DC model

- Wide range 100V~240VAC power input for -AC model

Specifications

Panel

- LED Size: 17", 4:3
- Resolution: SXGA 1280 x 1024
- Luminance: 350cd/m²
- Contrast ratio: 1000
- LCD color: 16.7M
- Viewing angle: 80(U), 80(D), 85(L), 85(R)
- Backlight: LED

Touch

For IPPC A1770T Series
- 5-wire resistive (flush panel type)
- Light transmission: 81%
- Interface: USB

For IPPC A1770P Series
- Five Points P-Cap (Projected Capacitive Touch)
- Light transmission: 87%
- Interface: USB
- Anti-scratch surface: 7H hardness

System

- CPU (optional): support 4th gen. Intel® Core™ processor family, LGA1150 socket type
  - Core™ i5-4590T, Quad Core, 3.0GHz, 6M Cache
  - Core™ i3-4350T, Dual Core, 3.1GHz, 4M Cache
  - Pentium® G3320TE, Dual Core, 2.3GHz, 3M Cache
  - Celeron® G1820TE, Dual Core, 2.2GHz, 2M Cache
- BIOS: AMI BIOS

- System chipset: Intel® Q87 PCH
- System memory (optional): 2x 204-pin DDR3/DDR3L SO-DIMM socket, support up to 16GB DDR3/ DDR3L 1333/1600, non-ECC and unbuffered
- Storage device:
  - 1x external locked CFast socket
  - 1x mini-PCIe w/o SIM card holder slot to support mSATA storage
  - 1x hard drive bay: support 1x 2.5" SATA HDD/SSD (optional) (for DC model only)
  - 2x hard drive bays: support 2x 2.5" SATA HDD/SSD (optional) RAID 0, 1 (for AC model only)
- Watchdog timer: Watchdog timeout can be programmed by software from 1 second to 255 seconds and from 1 minute to 255 minutes (tolerance 15% under room temperature 25°C)
- H/W status monitor: monitoring system temperature and voltage
- Expansion:
  - 2x mini-PCIe sockets (support optional Wi-Fi or 3.5G module/NVRAM/ mSATA storage)
  - 2x expansion slots for add-on PCI or/and PCIe cards
  - 1x PCI and 1x PCIe x4 slots
  - 2x PCIe x4 slots (default)
  - 2x PCI slots
  - 1x PCIe x16 slot
- Panel backlight control button: increase brightness/decrease brightness/ backlight on/off (for AC model only)

Rear I/O

For All
- 1x PS2 for keyboard/mouse
- Ethernet: 2x RJ45

- 2nd/3rd display: Additional independent display port: 1x DVI-I and 1x DisplayPort
- Audio port: 1x Line-out; 1x Line-in; 1x Mic-in
- USB: 4x USB3.0
- 3-pin Remote Power on/off switch connector
- Reset button

For IPPC A1770T/P-DC only
- COM#1: RS232/422/485 w/ 5V or 12V selection
- ATX power switch

For IPPC A1770T/P-AC only
- COM#1: RS232/422/485 w/ 2.5kv isolated protection
- AC power switch

Top I/O

For IPPC A1770T/P-DC only
- COM#2 RS232/422/485 w/ 5V or 12V selection

For IPPC A1770T/P-AC only
- COM#2: RS232/422/485 w/ 2.5kv isolated protection
- DIO w/ 2.5kv isolated protection:
  – 4x digital input (source type)
  – 4x digital output (sink type)
- GPIO: 4x Digital In/4x Digital Out

Audio

- HD Codec: Realtek ALC886-GR
- Audio interface: Line-out/Line-in/Mic-in audio jack

Ethernet

- LAN chip: dual Intel® I210IT Gigabit LAN
- Ethernet interface: 10/100/1000 Based-Tx Ethernet compatible

Fieldbus

- Support up to two Fieldbus Modules

Mechanical & Environment

- Color: pantone 432C\ RAL 70 24 front bezel
- Enclosure: aluminum front bezel with SPPC nickel plated housing
- IP protection: IP66 front
- Mounting: panel/wall/stand/VESA 100mm x 100mm
- Power

IPPC A1770TE2-DC/IPPC A1770PE2-DC
  – Power input: 12~30 VDC
  – Power connector: 3-pin phoenix connector

IPPC A1770TE2-AC/IPPC A1770PE2-AC
  – Power input: 100-240V~, 1.5A, 50-60Hz; Fuse: 250VAC/3A
  – Power connector: AC inlet (IEC60320 C14)
  – Power supply: 120W
- Vibration:
  – IEC 68 2-64 (w/ HDD)
  – 1Grms @ sine, 5~500Hz, 1hr/axis (HDD operating)
  – 2Grms @ sine, 5~500Hz, 1hr/axis (CFast operating)
  – 2.2Grms @ random condition, 5~500Hz, 0.5hr/axis (non-operating)
- Shock:
  – IEC 68 2-27
  – HDD: 20G @ wall mount, half sine, 11ms
- Operating temperature:
  – Resistive: -10°C to 50°C
  – P-Cap: -20°C to 50°C
- Storage temperature: -20°C to 75°C
- Operating humidity: 10%~90% relative humidity, non-condensing
- Dimension:
  – IPPC A1770TE2-DC/IPPC A1770PE2-DC/IPPC A1770TFE2-DC: 451mm x 375.5mm x 105mm

– IPPC A1770TE2-AC/IPPC A1770PE2-AC:
  451mm x 375.5mm x 92.9mm
▪ Weight: (Barebone)
  – IPPC A1770TE2-DC: 9.54kg
  – IPPC A1770PE2-DC: 9.6kg
  – IPPC A1770TE2-AC: 10.45kg
  – IPPC A1770PE2-AC: 10.51kg

Certifications
▪ CE (including EN61000-6-2/EN61000-6-4)
▪ FCC Class A

OS Support Lists
▪ Windows 7 32-bit and 64-bit
▪ Windows 8.1 32-bit and 64-bit

Knowing Your IPPC A1770T/P Series

IPPC A1770T/P-DC Rear Top

Fieldbus **COM2** **CFast**
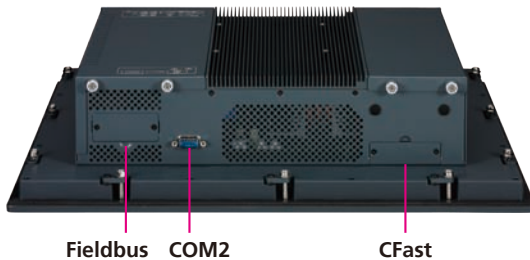
IPPC A1770T/P-DC Rear Bottom

PS/2 KB/MS
Fieldbus
COM1

Power **Remote** **LAN &** **Reset** **PCI/PCIe**
Switch **Switch** **USB 3.0** **Switch** **Expansions**
DC Input **Audio**
Connectors
DVI-I &
DisplayPort
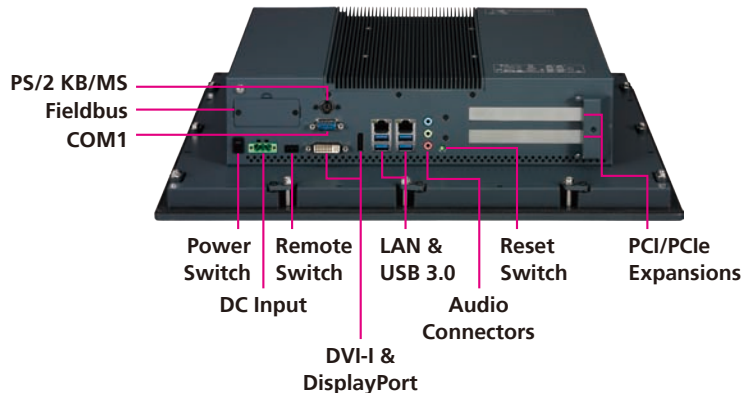
Fieldbus & CFast
Expansion slots for add-on fieldbus modules and CFast cards.

COM1 & COM2
Serial ports with RS232/422/485 support and 5V or 12V selection.

PS/2 KB/MS
Used to connect a PS/2 keyboard and a PS/2 mouse.

Power & Reset Switch
Press to power-on, power-off or restart the system.

Remote Switch
Used to connect a remote to power on/off the system.

DVI-I & DisplayPort
Used to connect display devices.

LAN & USB 3.0
LAN and USB 3.0 ports to connect the system to local area networks and USB devices.

Audio Connectors
Line-in, mic-in and line-out ports used to connect audio devices such as external microphones, speakers and headphones.

PCI/PCIe Expansions
PCI/PCIe expansion slots for add-on cards.

DC Input
Used to plug a DC power cord (terminal block connector).

CAUTION! Please use 12-28 AWG wire size and tighten the terminal block with a torque value of 4.5 lb-in.

IPPC A1770T/P-AC Rear Top

DIO
Fieldbus

COM2   GPIO   CFast

IPPC A1770T/P-AC Rear Bottom

COM1
PS/2 KB/MS
Power
Switch

Fieldbus   Remote   LAN &   Reset   PCI/PCIe
            Switch   USB 3.0   Switch   Expansions

AC Input
                                     Audio
                        DVI-I &   Connectors
                        DisplayPort
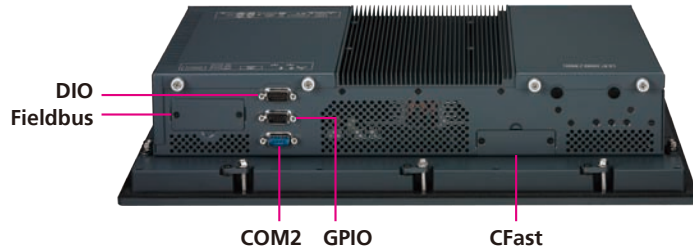
COM1 & COM2
Serial ports with RS232/422/485 support and 2.5kV isolated protection.

GPIO & DIO
The GPIO and DIO connector support 4 digital input and 4 digital output. The DIO connector includes 2.5kV isolated protection.

Fieldbus & CFast
Expansion slots for add-on fieldbus modules and CFast cards.

PS/2 KB/MS
Used to connect a PS/2 keyboard and a PS/2 mouse.

Power & Reset Switch
Press to power-on, power-off or restart the system.

AC Input
Used to plug an AC power cord.

Remote Switch
Used to connect a remote to power on/off the system.

DVI-I & DisplayPort
Used to connect display devices.

LAN & USB 3.0
LAN and USB 3.0 ports to connect the system to local area networks and USB devices.

Audio Connectors
Line-in, mic-in and line-out ports used to connect audio devices such as external microphones, speakers and headphones.

PCI/PCIe Expansions
PCI/PCIe expansion slots for add-on cards.

IPPC A1770T/P-DC Rear

VESA Mounting Hole — VESA Mounting Hole

VESA Mounting Hole — VESA Mounting Hole
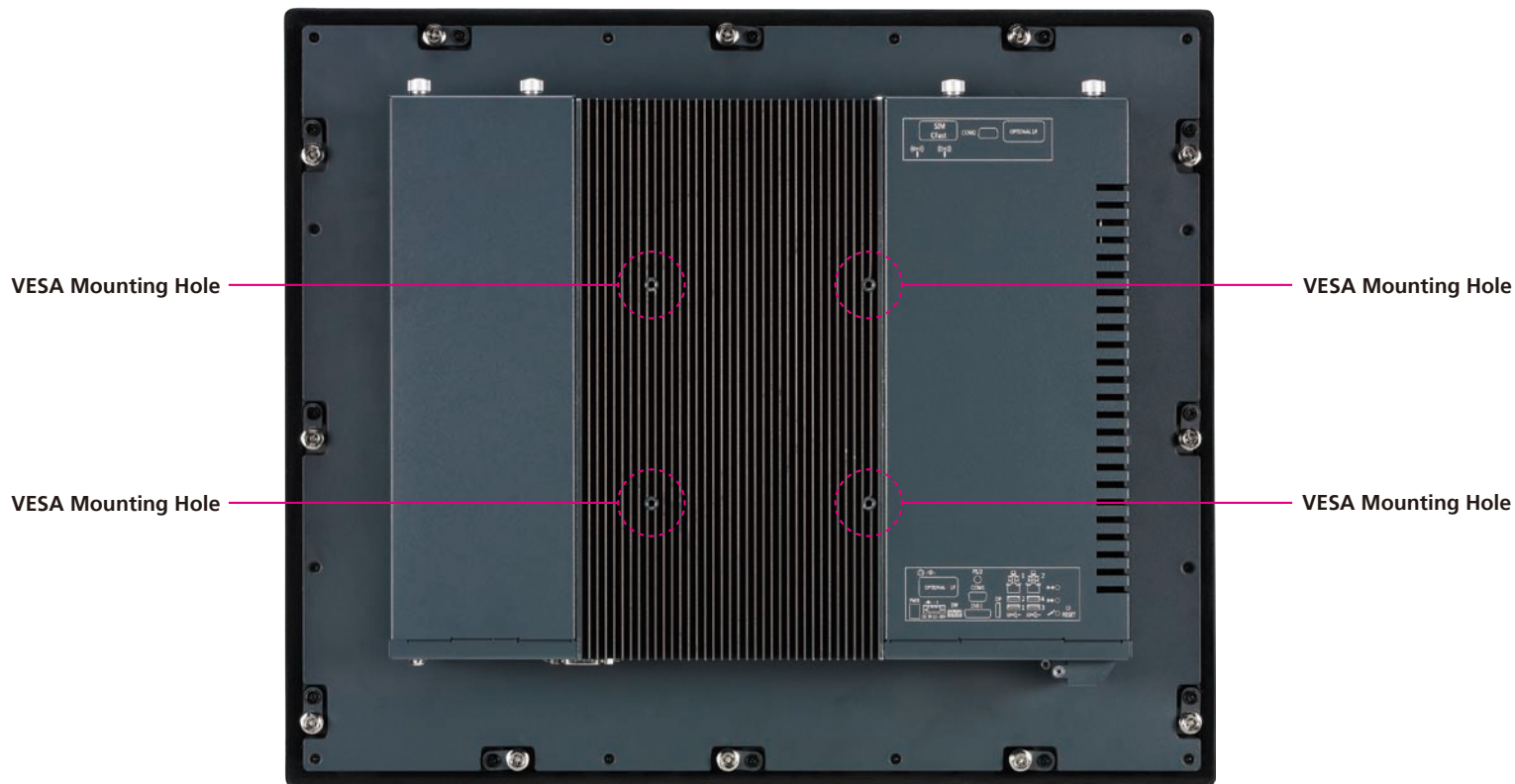
VESA Mounting Holes

These are mounting holes for VESA mount (100x100mm)

IPPC A1770T/P-AC Rear

VESA Mounting Hole

VESA Mounting Hole

VESA Mounting Hole

VESA Mounting Hole

2.5" HDD / SSD
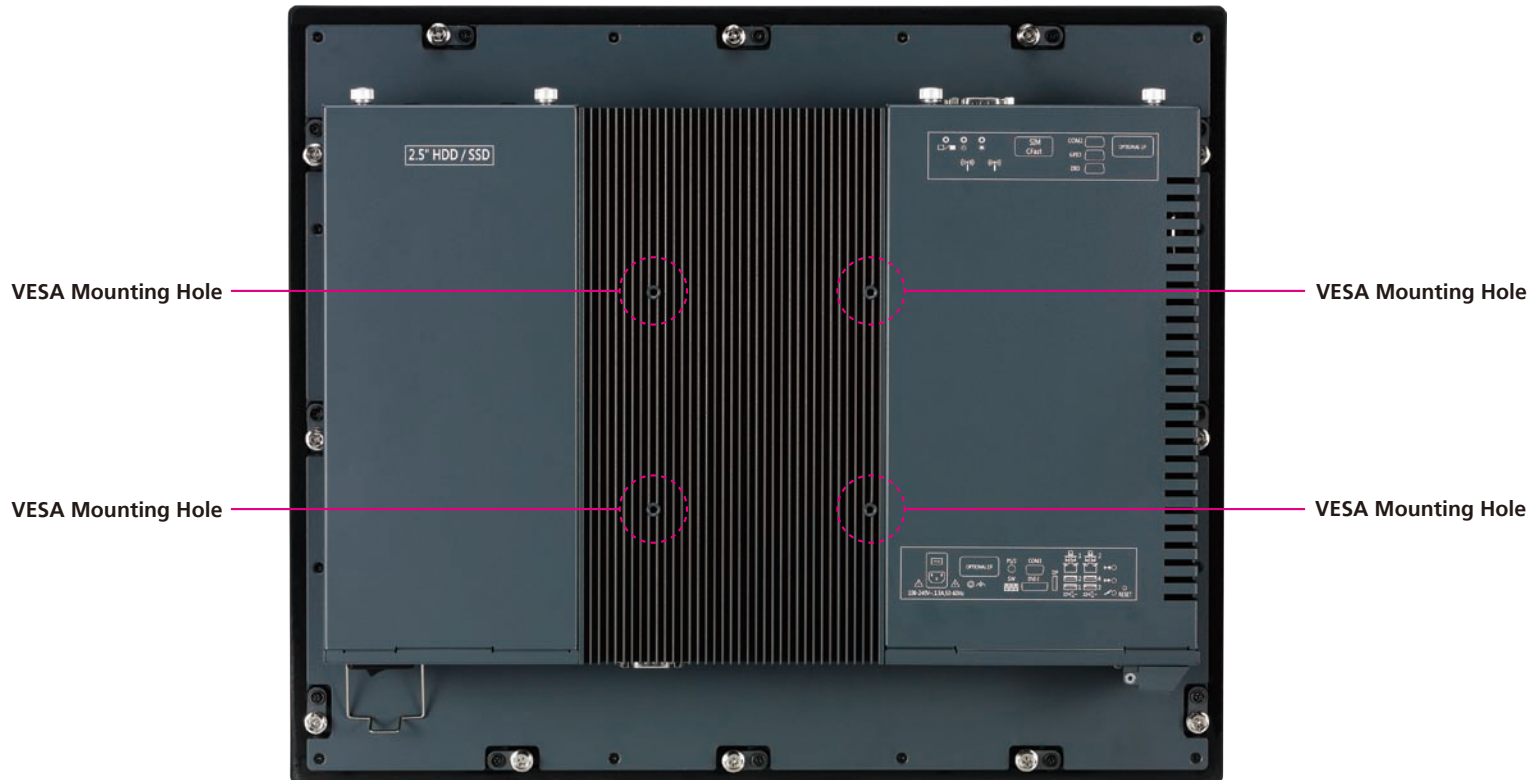
VESA Mounting Holes

These are mounting holes for VESA mount (100x100mm)

Mechanical Dimensions

IPPC A1770T/P-DC

IPPC A1770T/P-AC

Active Area
(339.92*272.34)

Active Center

PW LED
Light

2.5" HDD / SSD

451
339.92 (V/A)
55.54
169.96
39.83
136.17
375.5 (V/A)
272.34 (V/A)

92.9
25.7
6.5

23
405
152.5
100
85.5
140
140
49.08
60
271.3
258.3
135
135
86.8
100
356.9 (mounting line)
101.2
124.3
140
432.4 (mounting line)
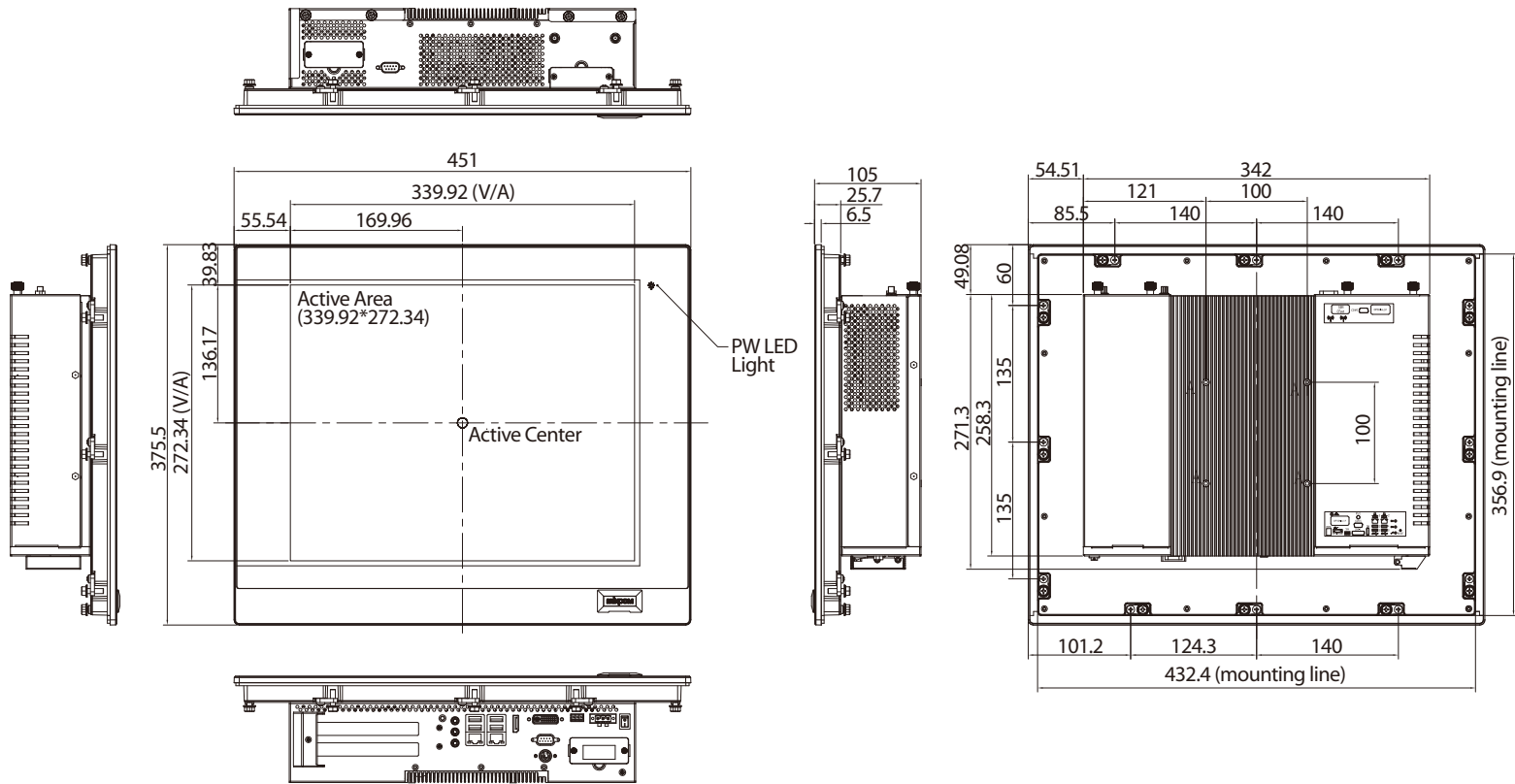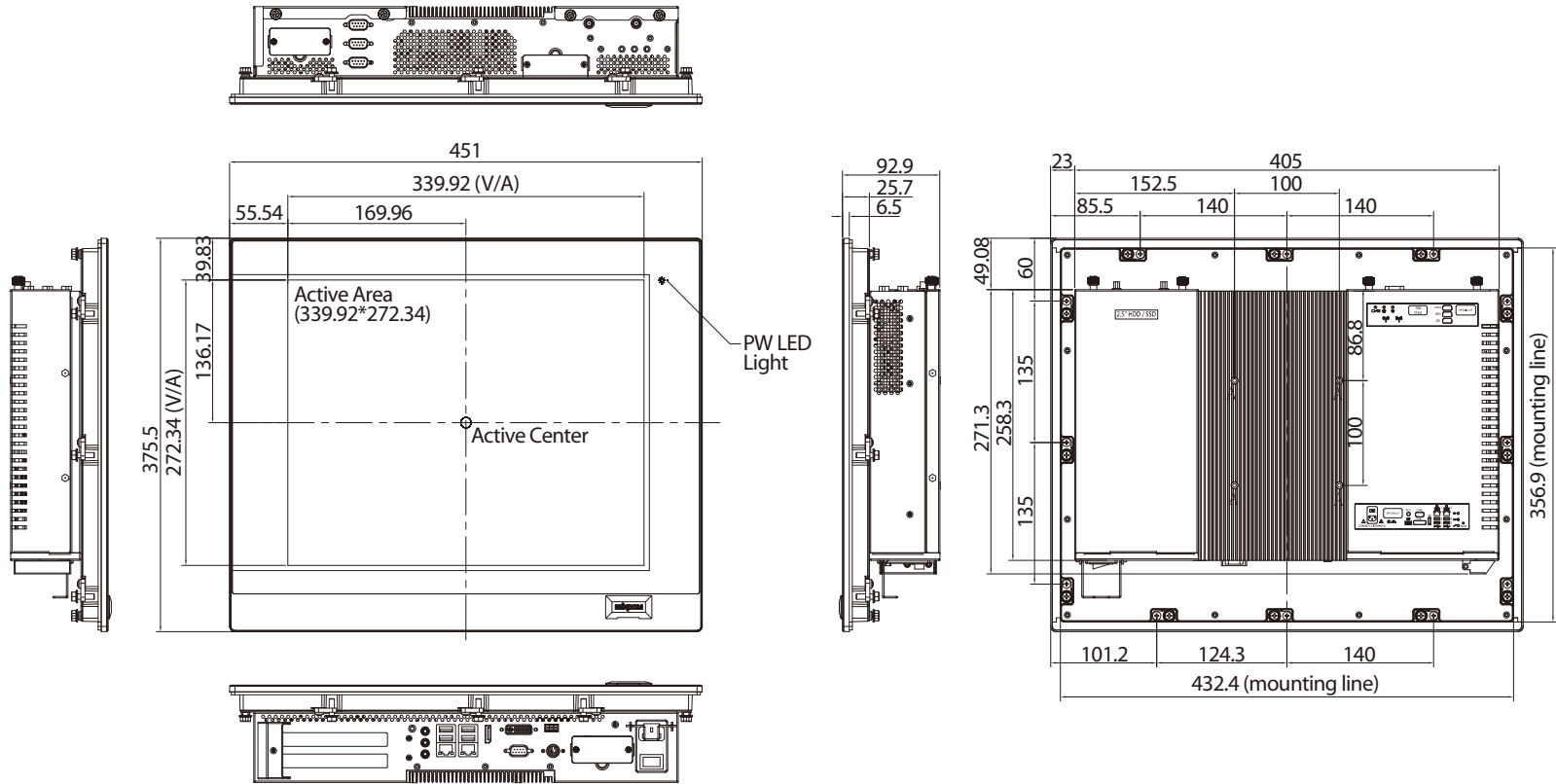
CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the motherboard. The information in this chapter applies to the IPPC A1770T and IPPC A1770P series.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  – A Philips screwdriver
  – A flat-tipped screwdriver
  – A set of jewelers screwdrivers
  – A grounding strap
  – An anti-static pad

- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:
- Always disconnect the unit from the power outlet whenever you are working inside the case.

- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.

- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.

- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation. Use correct screws and do not over tighten screws.

Jumper Settings

A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)
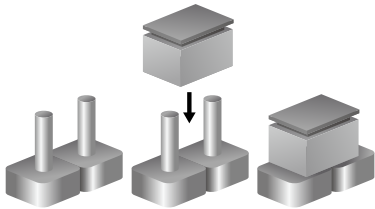
Three-Pin Jumpers: Pins 1 and 2 are Short
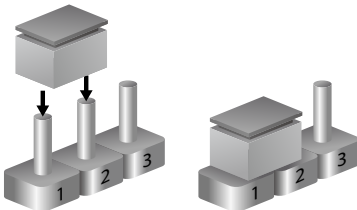
Locations of the Jumpers and Connectors

Top View

Bottom View

J7 CFast
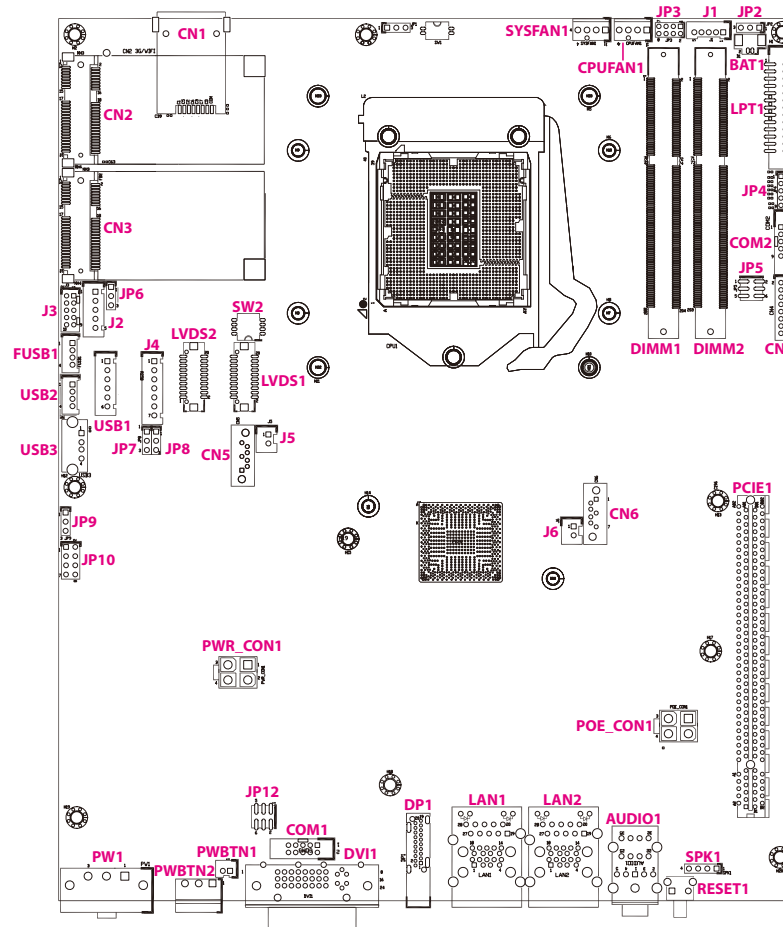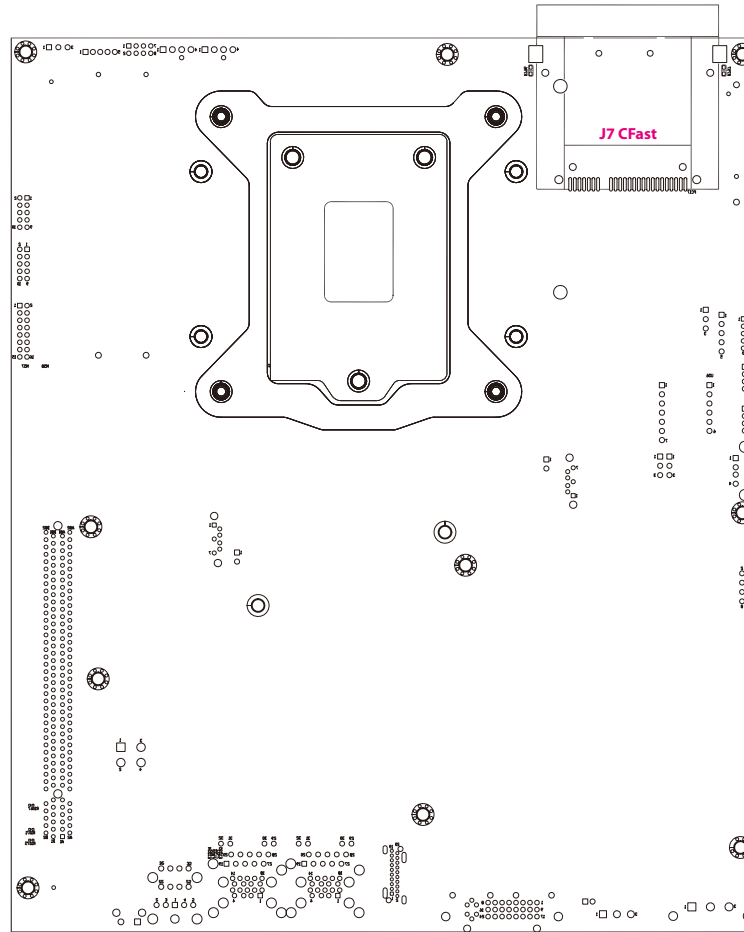
Jumpers and DIP Switch Settings

RTC Clear Select

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP2

1 □ ○ ○ 3

Pin	Settings
1-2 On	Normal
2-3 On	Clear BIOS

1-2 On: default

Pin	Definition
1	NC
2	RTC Power
3	GND

AT/ATX Selection

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP9

1 □ ○ ○ 3

Pin	Settings
1-2 On	AT Mode
2-3 On	ATX Mode

2-3 On: default

Pin	Definition
1	AUTO (AT MODE)
2	PWRBT In
3	Manual (ATX MODE)

Panel Resolution Select

Connector type: 4-pin On/Off Switch
Connector location: SW2
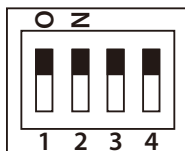
SW2-1	SW2-2	SW2-3	SW2-4	Resolution
OFF	OFF	ON	ON	1280 x 1024 (17")

Dimming Signal Level Select

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP7

Pin	Settings
1-2 On	3.3V
2-3 On	5V

2-3 On: default 17" panel

Pin	Definition
1	VCC3
2	Power for Dimming
3	VCC5

LCD Panel VDD Power Select

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP8

1 ▢ ○ ○ 3

Pin	Settings
1-2 On	3.3V
2-3 On	5V

2-3 On: default 17" panel

Pin	Definition
1	VCC3
2	Power for VDD
3	VCC5

COM1 and COM2 Power Select

Connector type: 2x3 6-pin header, 2.0mm pitch
Connector location: JP12 (COM1) and JP5 (COM2)

2 ○ ○ ○ 6
1 ▢ ○ ○ 5
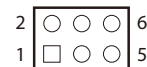
Pin	Settings
1-2 On	SP3_RI
3-4 On	+5V
5-6 On	+12V

1-2 On: default

Touch 4/5 Wire Select

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP6

1 ▢ ○ ○ 3

Pin	Settings
1-2 On	5 wire
2-3 On	4 wire

1-2 On: default

Connector Pin Definitions

External I/O Interface

Reset Button

Connector location: RESET1

Pin	Definition
1	GND
2	RESET

Audio Connectors

Connector type: 3.5mm audio jack
Connector location: AUDIO1

Line-in
Line-out
Mic-in
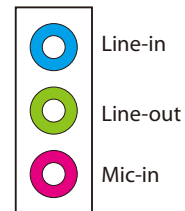
Pin	Definition	Pin	Definition
1	GND	2	MIC1_IN _L
3	MIC_JD	4	GND
5	MIC_IN_R		
22	LINE_OUT_L	23	LINE_OUT_JD
24	GND	25	LINE_OUT_R
32	LINE_IN_L	33	LINEIN_JD
34	GND	35	LINE_IN_R

LAN1 and Dual USB3.0 Ports

Connector type: RJ45 port with LEDs
Dual USB 3.0 ports, Type A
Connector location: LAN1A (USB) and LAN1B (LAN1)

USB
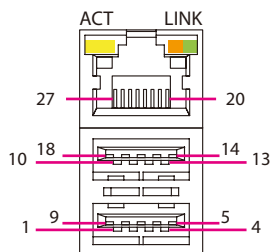
Pin	Definition	Pin	Definition
1	+5V_1	2	USB1 D-(2.0)
3	USB1 D+(2.0)	4	GND
5	USB1 RX-(3.0)	6	USB1 RX+(3.0)
7	GND	8	USB1 TX-(3.0)
9	USB1 TX+(3.0)	10	+5V_2
11	USB2 D-(2.0)	12	USB1 D+(2.0)
13	GND	14	USB2 RX-(3.0)
15	USB2 RX+(3.0)	16	GND
17	USB2 TX-(3.0)	18	USB2 TX+(3.0)

LAN

Pin	Definition	Pin	Definition
19	VCT	20	LAN1_MDI0P
21	LAN1_MDI0N	22	LAN1_MDI1P
23	LAN1_MDI1N	24	LAN1_MDI2P
25	LAN1_MDI2N	26	LAN1_MDI3P
27	LAN1_MDI3N	28	GND
29	ACT_LED+	30	ACT_LED-
31	LINK100M#	32	LINK1G#

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IPPC A1770T and IPPC A1770P Series User Manual

LAN2 and Dual USB3.0 Ports

Connector type: RJ45 port with LEDs
Dual USB 3.0 ports, Type A
Connector location: LAN2A (USB) and LAN2B (LAN2)

USB
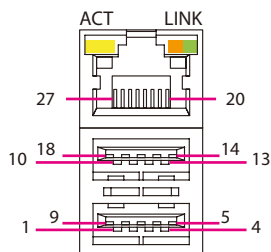
Pin	Definition	Pin	Definition
1	+5V_1	2	USB3 D-(2.0)
3	USB3 D+(2.0)	4	GND
5	USB3 RX-(3.0)	6	USB3 RX+(3.0)
7	GND	8	USB3 TX-(3.0)
9	USB3 TX+(3.0)	10	+5V_2
11	USB4 D-(2.0)	12	USB3 D+(2.0)
13	GND	14	USB4 RX-(3.0)
15	USB4 RX+(3.0)	16	GND
17	USB4 TX-(3.0)	18	USB4 TX+(3.0)

LAN

Pin	Definition	Pin	Definition
19	VCT	20	LAN2_MDI0P
21	LAN2_MDI0N	22	LAN2_MDI1P
23	LAN2_MDI1N	24	LAN2_MDI2P
25	LAN2_MDI2N	26	LAN2_MDI3P
27	LAN2_MDI3N	28	GND
29	LAN2 ACT_LED+	30	LAN2 ACT_LED-
31	LAN2 LINK100M#	32	LAN2 LINK1G#

DisplayPort

Connector type: DisplayPort
Connector location: DP1
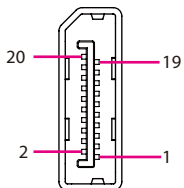
Pin	Definition	Pin	Definition
1	LANE0_P	2	GND
3	LANE0_N	4	LANE1_P
5	GND	6	LANE1_N
7	LANE2_P	8	GND
9	LANE2_N	10	LANE3_P
11	GND	12	LANE3_N
13	CONFIG1	14	CONFIG2
15	AUX_P	16	GND
17	AUX_N	18	Hot Plug Detect
19	PWR_RETURN(GND)	20	DP_PWR

DVI-I Connector

Connector type: 24-pin D-Sub, 2.0mm-M-180 (DVI)
Connector location: DVI1
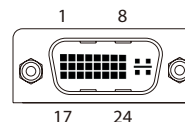
Pin	Definition	Pin	Definition
1	TX2-	2	TX2+
3	GND	4	NC
5	NC	6	DVI_DDC_CLK
7	DVI_DDC_DATA	8	VGA_VSYNC
9	TX1-	10	TX1+
11	GND	12	NC
13	NC	14	+5V
15	GND	16	Hot Plug Detect
17	TX0-	18	TX0+
19	GND	20	VGA_DDC_CLK
21	VGA_DDC_DATA	22	GND
23	TX_CLK+	24	TX_CLK-
C1	VGA_RED	C2	VGA_GREEN
C3	VGA_BLUE	C4	VGA_HSYNC
C5A	GND	C5B	GND

Remote Power Button Connector

Connector type: 1x3 3-pin terminal block
Connector location: PWBTN2

Pin	Definition
1	PWRBT
2	GND
3	SLP_S3#

12~30V DC Power Input (DC-Powered Models Only)

Connector type: 1x3 3-pin terminal block
Connector location: PW1
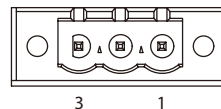
Pin	Definition
1	Power in +
2	Power in -
3	Mechanical GND

CFast Slot

Connector location: J7

SIM Card Slot

Connector location: CN1
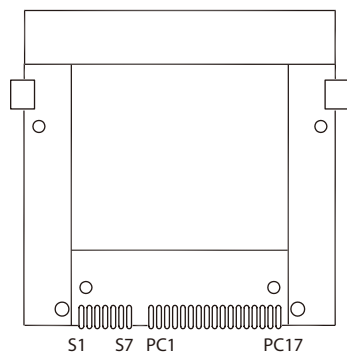
Pin	Definition	Pin	Definition
S1	GND	PC6	NC
S2	SATA_TXP2	PC7	GND
S3	SATA_TXN2	PC8	CFAST_LED1_C
S4	GND	PC9	CFAST_LED2_C
S5	SATA_RXN2	PC10	NC
S6	SATA_RXP2	PC11	NC
S7	GND	PC12	NC
PC1	CFAST_CDI	PC13	VCC3
PC2	GND	PC14	VCC3
PC3	NC	PC15	GND
PC4	NC	PC16	GND
PC5	NC	PC17	CFAST_CDO_C
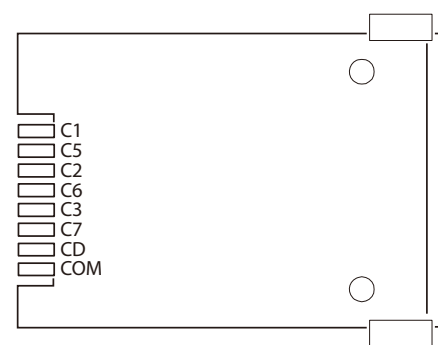
Pin	Definition	Pin	Definition
C1	UIM_PWR	C2	UIM_RST
C3	UIM_CLK	C5	GND
C6	UIM_VCCP	C7	UIM_DAT

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Internal Connectors

DC Input

Connector type: 2x2 4-pin header
Connector location: PWR_CON1
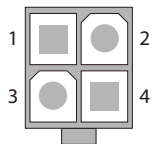
Pin	Definition	Pin	Definition
1	GND	2	GND
3	+12V	4	+12V

DC Output

Connector type: 2x2 4-pin header
Connector location: POE_CON1
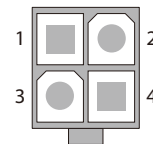
Pin	Definition	Pin	Definition
1	GND	2	GND
3	Power+(9V~30V)	4	Power+(9V~30V)

Power Button

Connector type: 1x2 2-pin header JST, 2.0mm pitch
Connector location: PWBTN1
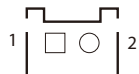
Pin	Definition
1	PWRBT
2	GND

Backlight and Dimming Control Input Connector

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: J3
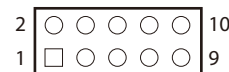
Pin	Definition	Pin	Definition
1	Light sensor power(3.3V)	2	3.3V
3	Light sensor input	4	PIR Input
5	Dimming increased input	6	Backlight On/OFF
7	Dimming decreased input	8	EC_SMBDATA
9	GND	10	EC_SMBCLK

LCD Backlight Connector

Connector type: 1x7 7-pin header JST, 2.5mm pitch
Connector location: J4

LVDS Channel A Connector

Connector type: 2x10 20-pin header, 1.25mm pitch
Connector location: LVDS1
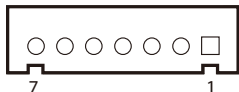
Pin	Definition	Pin	Definition
1	VCC5	2	12V
3	12V	4	BKCTRL
5	GND	6	GND
7	BKLEN		

Pin	Definition	Pin	Definition
1	NC	2	NC
3	VDD	4	LVDS_DAT0P
5	LVDS_DAT3P	6	LVDS_DAT0N
7	LVDS_DAT3N	8	VDD
9	GND	10	LVDS_DAT1P
11	LVDS_CLK1P	12	LVDS_DAT1N
13	LVDS_CLK1N	14	GND
15	GND	16	+12V
17	LVDS_DAT2P	18	+12V
19	LVDS_DAT2N		

LVDS Channel B Connector

Connector type: 2x10 20-pin header, 1.25mm pitch
Connector location: LVDS2

Pin	Definition	Pin	Definition
1	NC	2	NC
3	VDD	4	LVDS_DAT4P
5	LVDS_DAT7P	6	LVDS_DAT4N
7	LVDS_DAT7N	8	VDD
9	GND	10	LVDS_DAT5P
11	LVDS_CLK2P	12	LVDS_DAT5N
13	LVDS_CLK2N	14	GND
15	GND	16	+12V
17	LVDS_DAT6P	18	+12V
19	LVDS_DAT6N		

Touch Sensor Connector

Connector type: 1x5 5-pin header JST, 2.5mm pitch
Connector location: J2
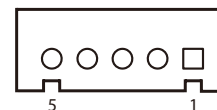
Pin	4-Wire	5-Wire
1	Bottom	UR (H)
2	Right	LR (X)
3	N/A	Sense (S)
4	Top	UL (Y)
5	Left	LL (L)

Internal USB Connector

Connector type: 1x6 6-pin header JST, 2.5mm pitch
Connector location: USB1
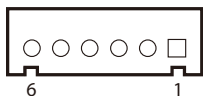
Pin	Definition	Pin	Definition
1	+5V	2	USB2_4N
3	USB2_4P	4	USB2_5N
5	USB_5P	6	GND

Front USB Connector

Connector type: 1x4 4-pin header JST, 2.0mm pitch
Connector location: FUSB1
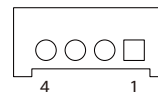
Pin	Definition	Pin	Definition
1	+5V	2	USB2_6N
3	USB2_6P	4	GND

Internal USB Connector

Connector type: 1x4 4-pin header JST, 2.0mm pitch
Connector location: USB2

Pin	Definition	Pin	Definition
1	+5V	2	USB2_10N
3	USB2_10P	4	GND

USB Connector

Connector type: USB port
Connector location: USB3

Pin	Definition	Pin	Definition
1	+5V	2	USB2_11N
3	USB2_11P	4	GND

SATA0 Connector

Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: CN5
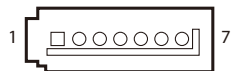
Pin	Definition	Pin	Definition
1	GND	2	TXP0
3	TXN0	4	GND
5	RXN0	6	RXP0
7	GND		

SATA1 Connector

Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: CN6
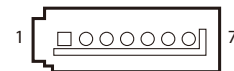
Pin	Definition	Pin	Definition
1	GND	2	TXP1
3	TXN1	4	GND
5	RXN1	6	RXP1
7	GND		

SATA/SATA DOM Power Connectors

Connector type: 1x2 2-pin header JST, 2.5mm pitch
Connector location: J5 and J6
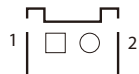
Pin	Definition
1	+5V
2	GND

Speaker-out Pin Header

Connector type: 1x4 4-pin header, 2.54mm pitch
Connector location: SPK1

Pin	Definition	Pin	Definition
1	OUT-L+	2	OUT-L-
3	OUT-R+	4	OUT-R-

COM1 Connector (Isolation with RS422/485 Feature)

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: COM1

Pin	Definition	Pin	Definition
1	COM1_DCD	2	COM1_RXD
3	COM1_TXD	4	COM1_DTR
5	COM1_GND	6	COM1_DSR
7	COM1_RTS	8	COM1_CTS
9	COM1_RI	10	COM1_GND

COM2 Connector (Isolation with RS422/485 Feature)

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: COM2

Pin	Definition	Pin	Definition
1	COM2_DCD	2	COM2_RXD
3	COM2_TXD	4	COM2_DTR
5	COM2_GND	6	COM2_DSR
7	COM2_RTS	8	COM2_CTS
9	COM2_RI	10	COM2_GND

DIO Connector

Connector type: 2x8 16-pin header, 2.0mm pitch
Connector location: CN4

```
2  ○ ○ ○ ○ ○ ○ ○ ○  16
1  □ ○ ○ ○ ○ ○ ○ ○  15
```
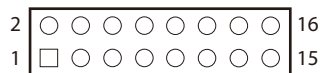
Pin	Definition	Pin	Definition
1	DI1	2	DO1
3	DI2	4	DO2
5	DI3	6	DO3
7	DI4	8	DO4
9	NC	10	NC
11	COM1	12	NC
13	GND	14	GND
15	GND	16	GND

GPIO Connector

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: JP4

```
2  ○ ○ ○ ○ ○  10
1  □ ○ ○ ○ ○  9
```
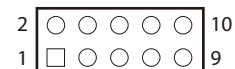
Pin	Definition	Pin	Definition
1	+5V	2	GND
3	GPI1 (GPI)	4	GPO1 (GPO)
5	GPI2 (GPI)	6	GPO2 (GPO)
7	GPI3 (GPI)	8	GPO3 (GPO)
9	GPI4 (GPI)	10	GPO4 (GPO)

RTC Battery Connector

Connector type: 1x2 2-pin header, 1.25mm pitch
Connector location: BAT1
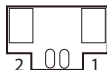
Pin	Definition
1	BATT-
2	BATT+

Active LED Connector

Connector type: 1x5 5-pin header JST, 2.5mm pitch
Connector location: J1
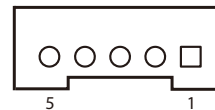
Pin	Definition	Pin	Definition
1	HDD_LED-	2	HDD_LED+
3	PWR_GND	4	5VSB
5	VCC5		

Software Programming IO Connector

Connector type: 2x4 8-pin header, 2.54mm pitch
Connector location: JP3
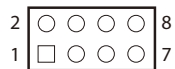
Pin	Definition	Pin	Definition
1	LED1+	2	LED1-
3	LED2+	4	LED2-
5	LED3+	6	LED3-
7	LED4+	8	LED4-

Keyboard/Mouse Connector

Connector type: 2x4 8-pin header, 2.54mm pitch
Connector location: JP10
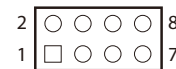
Pin	Definition	Pin	Definition
1	VCC5	2	VCC5
3	KB_DATA	4	MS_DATA
5	KB_CLK	6	MS_CLK
7	GND	8	GND

CPU Fan Connector

Connector type: 1x4 4-pin Wafer, 2.54mm pitch
Connector location: CPUFAN1

1 □ ○ ○ ○ 4
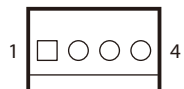
Pin	Definition	Pin	Definition
1	GND	2	+12V
3	FAN Speed Detect	4	FAN Speed Control

System Fan Connector

Connector type: 1x4 4-pin Wafer, 2.54mm pitch
Connector location: SYSFAN1

1 □ ○ ○ ○ 4

Pin	Definition	Pin	Definition
1	GND	2	+12V
3	FAN Speed Detect	4	FAN Speed Control

Printer Port Connector

Connector type: 2x13 26-pin header, 2.0mm pitch
Connector location: LPT1
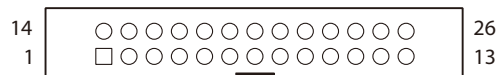
Pin	Definition	Pin	Definition
1	STB#	2	D0
3	D1	4	D2
5	D3	6	D4
7	D5	8	D6
9	D7	10	ACK#
11	BUSY	12	PE
13	SCLT	14	AFD#
15	ERR#	16	INIT#
17	SLIN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

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Mini-PCIe Slot (Wi-Fi/3G)

Connector location: CN2
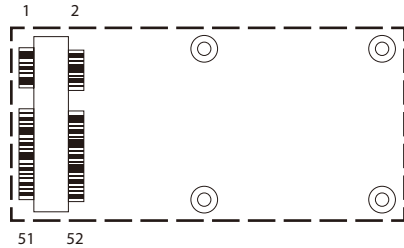
Pin	Definition	Pin	Definition
1	PCIEWAKE	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	CLKREQ	8	UIM_PWR
9	GND	10	UIM_DAT
11	PCIECLKN	12	UIM_CLK
13	PCIECLKP	14	UIM_RST
15	GND	16	UIM_VCCP
17	NC	18	GND
19	NC	20	DISABLE
21	GND	22	PLTRSTBF
23	PCIERX4N	24	3.3V
25	PCIERX24P	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIETX4N	32	SMBDATA
33	PCIETX4P	34	GND
35	GND	36	USB2N
37	GND	38	USB2P
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	NC
45	CL_CLK	46	NC
47	CL_DATA	48	1.5V
49	CL_RST#	50	GND
51	NC	52	3.3V

Mini-PCIe Slot (PCIe/mSATA)

Connector location: CN3
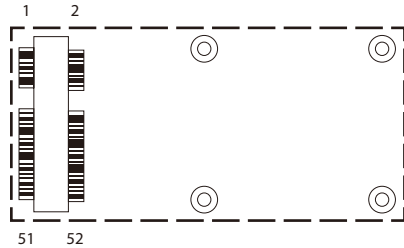
Pin	Definition	Pin	Definition
1	WAKE0#	2	+V3.3_MINI
3	NC	4	GND
5	NC	6	+V1.5S_MINI
7	NC	8	NC
9	GND	10	NC
11	GPP_CLK1_N	12	NC
13	GPP_CLK1_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINICARD1_DIS#
21	GND	22	PCIE_RST#
23	PCIE_RX2N/mSATA_RxP	24	+V3.3A_MINI
25	PCIE_RX2P/mSATA_RxN	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S_MINI
29	GND	30	SMB_CLK
31	PCIE_TX3N/mSATA_TxN	32	SMB_DAT
33	PCIE_TX3P/mSATA_TxP	34	GND
35	GND	36	USB_1N
37	GND	38	USB_1P
39	+V3.3A_MINI	40	GND
41	+V3.3A_MINI	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+V1.5S_MINI
49	NC	50	GND
51	PCIE/mSATA detect	52	+V3.3A_MINI

PCIe x16 Slot

Connector type: PCIe x16 Slot
Connector location: PCIE1

Pin	Definition	Pin	Definition
A1	PCIE_PRSNT1	B1	12V
A2	12V	B2	12V
A3	12V	B3	12V
A4	GND	B4	GND
A5	TCK	B5	SMB_CLK
A6	TDI	B6	SMB_DATA
A7	NC	B7	GND
A8	TMS	B8	3.3V
A9	3.3V	B9	GND
A10	3.3V	B10	3.3V standby
A11	RESET#	B11	Wake#
A12	GND	B12	GPU_POK
A13	CLK+	B13	12V
A14	CLK-	B14	PET0+
A15	GND	B15	PET0-
A16	PER0+	B16	GND
A17	PER0-	B17	PRSNT#
A18	GND	B18	GND

Pin	Definition	Pin	Definition
A19	GPU_PWR_EN#	B19	PET1+
A20	GND	B20	PET1-
A21	PER1+	B21	GND
A22	PER1-	B22	GND
A23	GND	B23	PET2+
A24	GND	B24	PET2-
A25	PER2+	B25	GND
A26	PER2-	B26	GND
A27	GND	B27	PET3+
A28	GND	B28	PET3-
A29	PER3+	B29	GND
A30	PER3-	B30	GPU_PRSNT#
A31	GND	B31	NC
A32	NC	B32	GND
A33	NC	B33	PET4+
A34	GND	B34	PET4-
A35	PER4+	B35	GND
A36	PER4-	B36	GND

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Pin	Definition	Pin	Definition
A37	GND	B37	PET5+
A38	GND	B38	PET5-
A39	PER5+	B39	GND
A40	PER5-	B40	GND
A41	GND	B41	PET6+
A42	GND	B42	PET6-
A43	PER6+	B43	GND
A44	PER6-	B44	GND
A45	GND	B45	PET7+
A46	GND	B46	PET7-
A47	PER7+	B47	GND
A48	PER7-	B48	NC
A49	GND	B49	GND
A50	NC	B50	PET8+
A51	GND	B51	PET8-
A52	PER8+	B52	GND
A53	PER8-	B53	GND
A54	GND	B54	PET9+
A55	GND	B55	PET9-
A56	PER9+	B56	GND
A57	PER9-	B57	GND
A58	GND	B58	PET10+
A59	GND	B59	PET10-

Pin	Definition	Pin	Definition
A60	PER10+	B60	GND
A61	PER10-	B61	GND
A62	GND	B62	PET11+
A63	GND	B63	PET11-
A64	PER11+	B64	GND
A65	PER11-	B65	GND
A66	GND	B66	PET12+
A67	GND	B67	PET12-
A68	PER12+	B68	GND
A69	PER12-	B69	GND
A70	GND	B70	PET13+
A71	GND	B71	PET13-
A72	PER13+	B72	GND
A73	PER13-	B73	GND
A74	GND	B74	PET14+
A75	GND	B75	PET14-
A76	PER14+	B76	GND
A77	PER14-	B77	GND
A78	GND	B78	PET15+
A79	GND	B79	PET15-
A80	PER15+	B80	GND
A81	PER15-	B81	NC
A82	GND	B82	GPU_SELECT#

Note: This slot supports a maximum power consumption of 25W.

CHAPTER 3: SYSTEM SETUP

Installing a Riser Card

CAUTION! Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. Remove the 4 screws on the rear top panel.

2. On the rear bottom panel, remove the screw on the PCI/PCIe expansion cover.
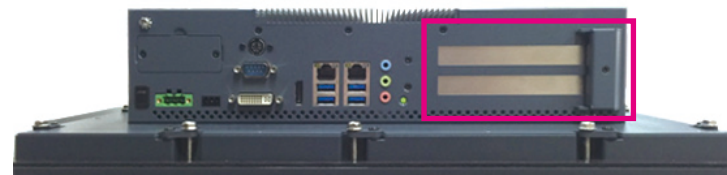
3. Open the PCI/PCIe bracket cover.
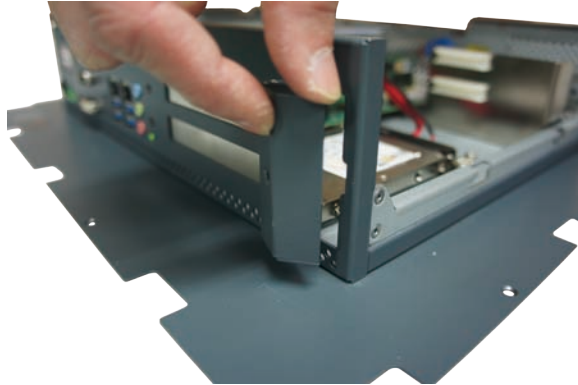
4. Remove the screw on the PCI/PCIe slot.
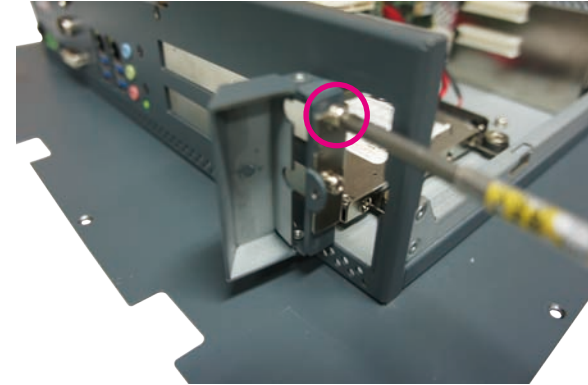
5. Remove the PCI/PCIe slot cover.

6. Remove the screws on the riser card bracket, which will be used to secure the rear end of the riser card.
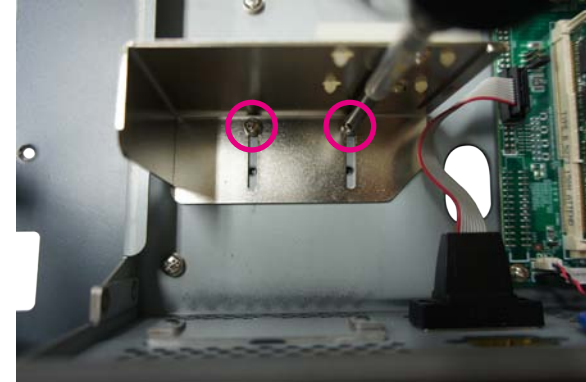
7. Install the riser card.
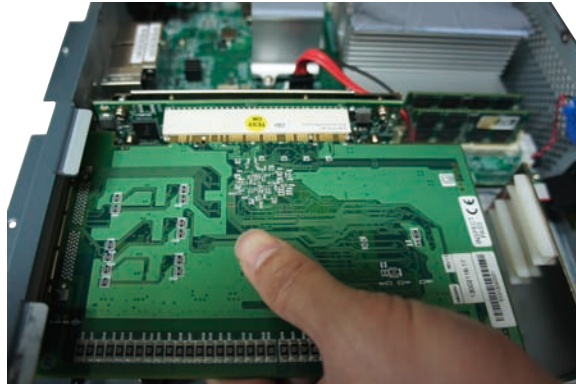
8. Push the riser card bracket towards the riser card until it secures the card in place.

9. Secure the riser card bracket with screws.
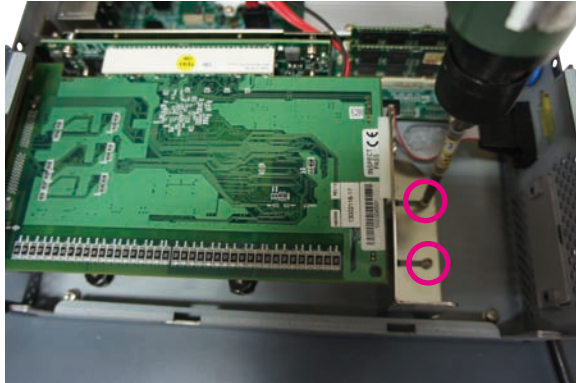
Alternative Method for Fixing the Riser Card

1. Remove the screws on the riser card bracket.
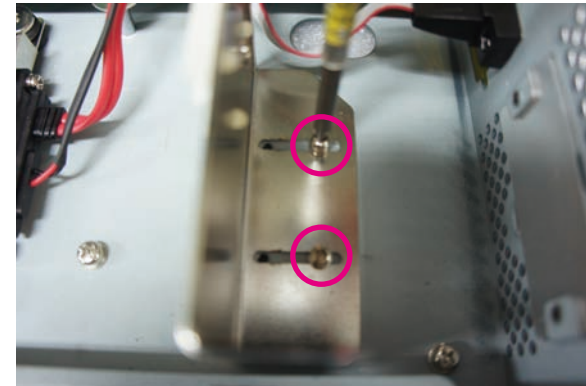
2. Take out the riser card bracket.
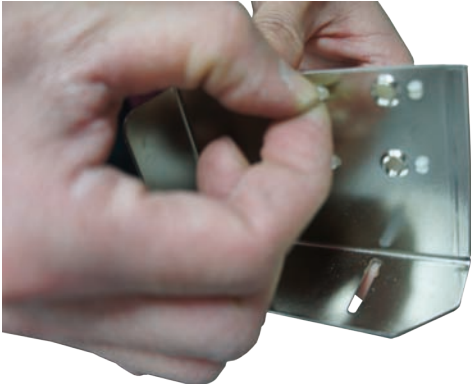
3. Put the plastic screw through the screw hole.

4. Push the riser card bracket towards the riser card until the plastic screw secures the card in place.
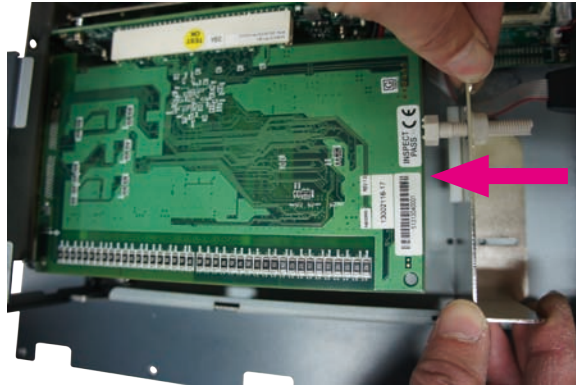
5. Secure the riser card bracket with screws.
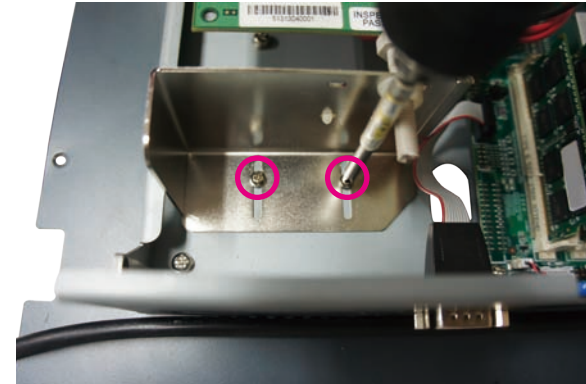
6. Cut off the remaining plastic screw end.
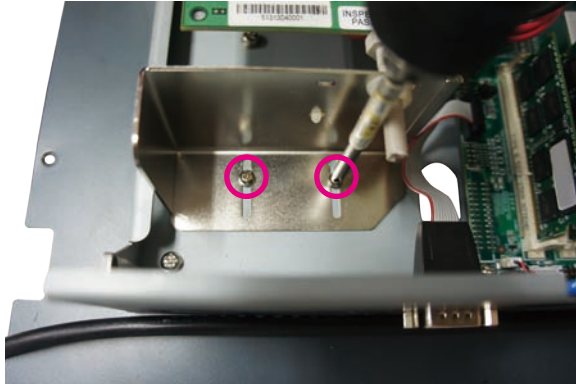
7. Fasten the screw back to the PCI/PCIe expansion slot cover to secure the riser card.

Installing a CFast Card and Mini-PCIe 3G/4G SIM Card

1. The CFast slot is located on the rear top side of the chassis. Remove the screws on the cover and take it off the chassis.
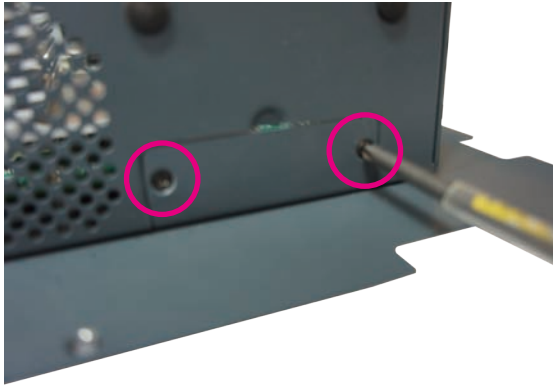
2. Insert the CFast card until it is completely seated in the socket.

3. Insert the SIM card until it is completely seated in the socket.
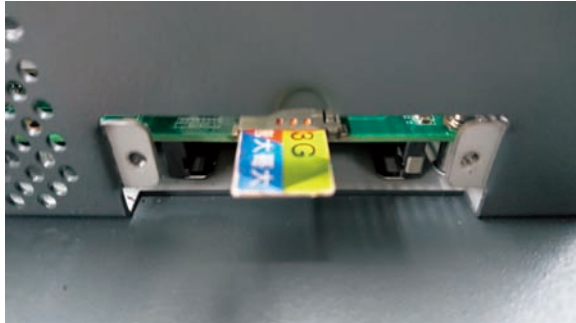
4. Screw the cover back in place.
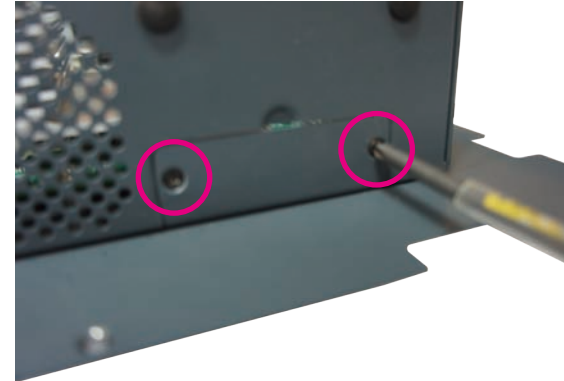
Installing a Mini-PCIe Module

1. Insert the mini-PCIe module into the mini-PCIe slot at a 45-degree angle until the gold-plated connector on the edge of the module completely disappears inside the slot.
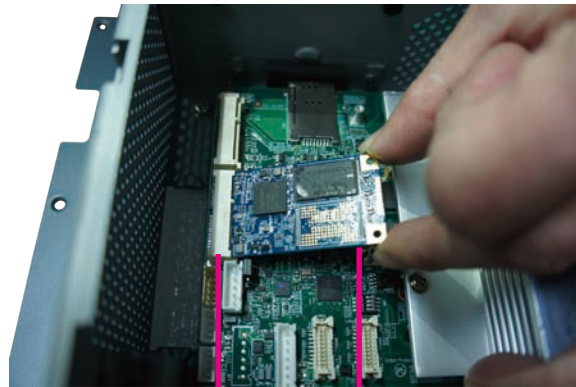
Mini-PCIe Slot   **Mini-PCIe Module**

2. Secure the module with mounting screw.

Installing a CPU

1. Locate the CPU socket and unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.

2. Lift the load plate up.

Load Lever

Retention Tab
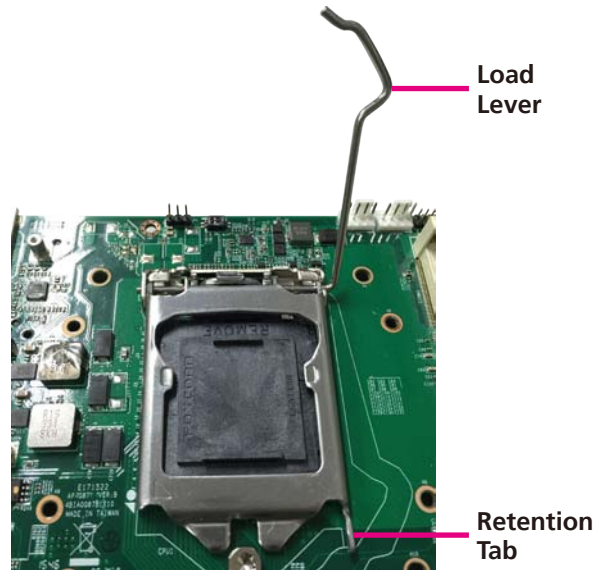
Load Plate
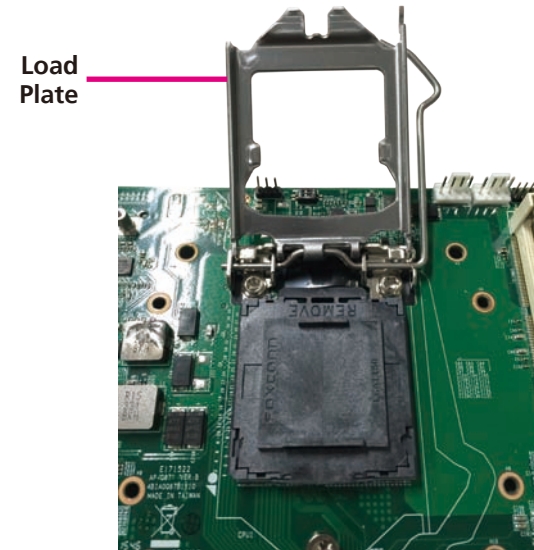
3. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.
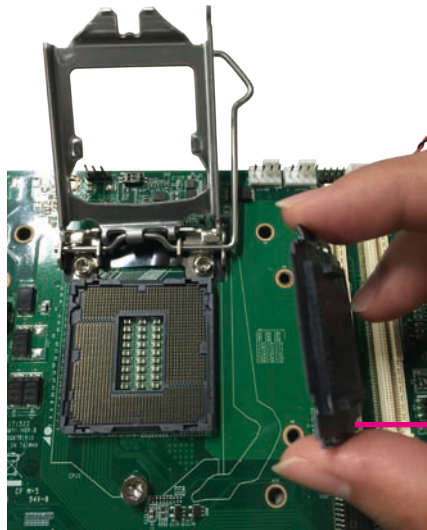
Protective Cap

4. Insert the CPU into the socket. The triangular edge on the CPU must align with the corner of the CPU socket shown on the photo.
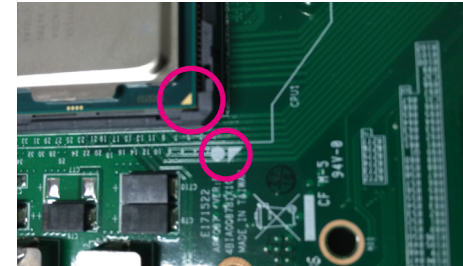
- Handle the CPU by its edges and avoid touching the pins.
- The CPU will fit in only one orientation and can easily be inserted without exerting any force.

5. Close the load plate and then hook the load lever under the retention tab.
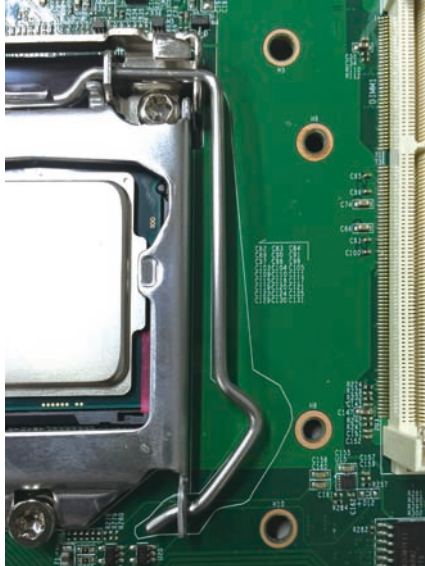
6. Install the heat sink on top of the CPU.
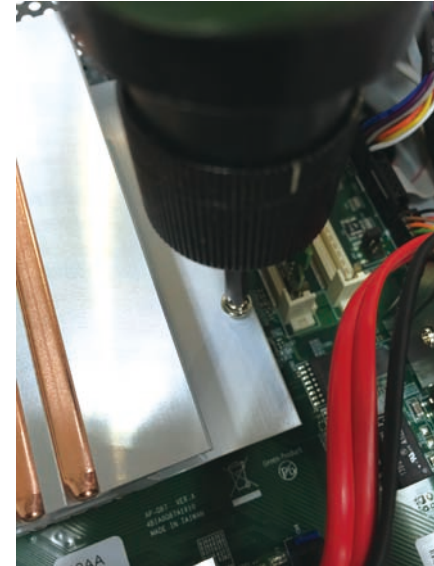
CAUTION! Do not force the CPU into the socket. Forcing the CPU into the socket may bend the pins and damage the CPU.

Installing a SO-DIMM Memory Module

1. Locate the SO-DIMM sockets and insert the module into the socket at an approximately 30-degree angle. Apply firm even pressure to each end of the module until it slips into the socket. The gold-plated connector on the edge of the module will almost completely disappear inside the socket.

2. Push the module down until the clips on both sides of the socket lock into position. You will hear a distinctive "click" sound, indicating the module is correctly locked into position.
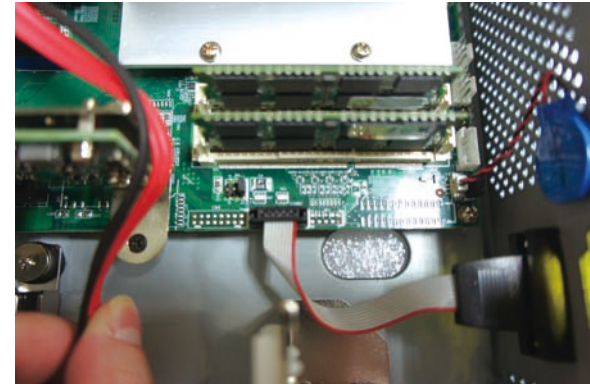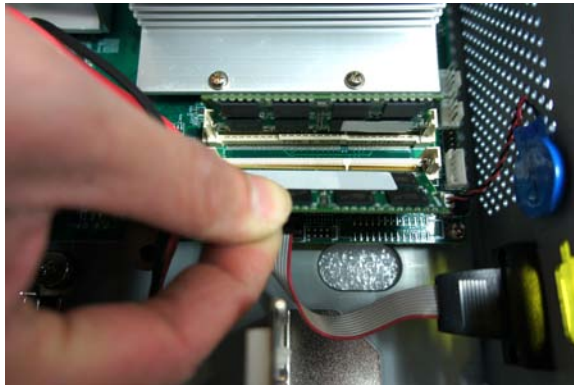
Installing a Primary 2.5" HDD/SDD (-AC Model Only)

1. With the chassis cover removed, locate the primary hard drive bracket and remove the mounting screws on the bracket.

2. Place the hard drive into the bracket until the connector on the hard drive is completely seated into the SATA connector on the bracket. Secure the bracket back to its original location.
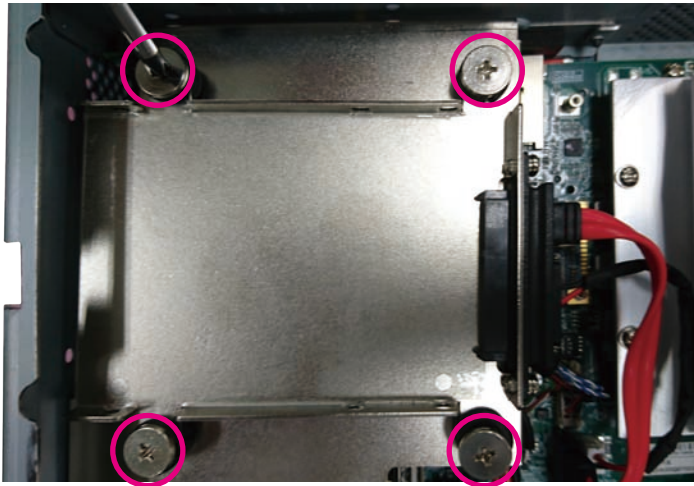
SATA Connector

Installing a Secondary 2.5" HDD/SDD

1. With the chassis cover removed, locate the secondary hard drive bracket and remove the mounting screws on the bracket.

2. Place the hard drive into the bracket until the connector on the hard drive is completely seated into the SATA connector on the bracket.
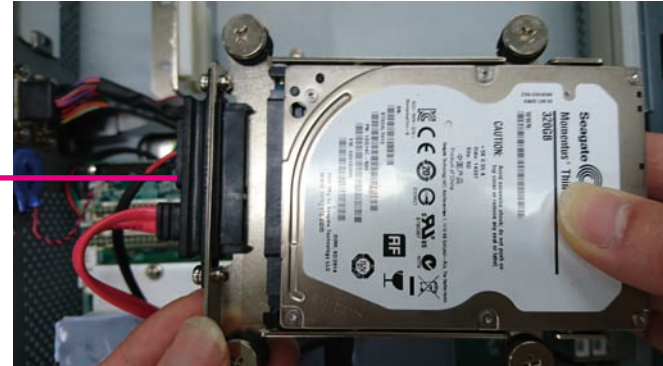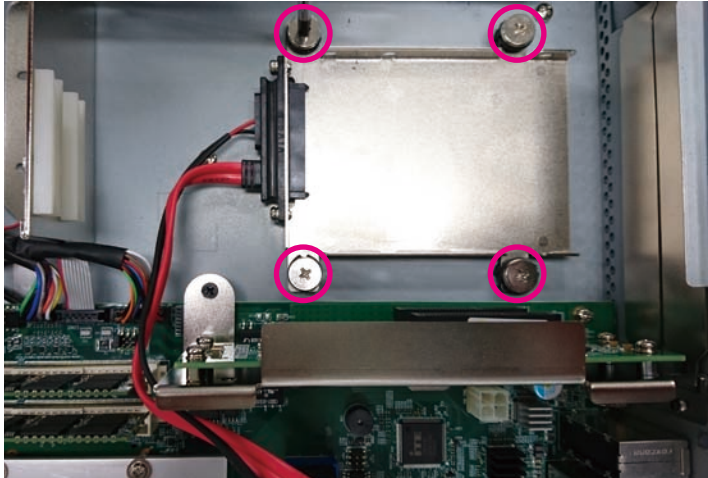
SATA Connector

3. Secure the SATA connector with screws.
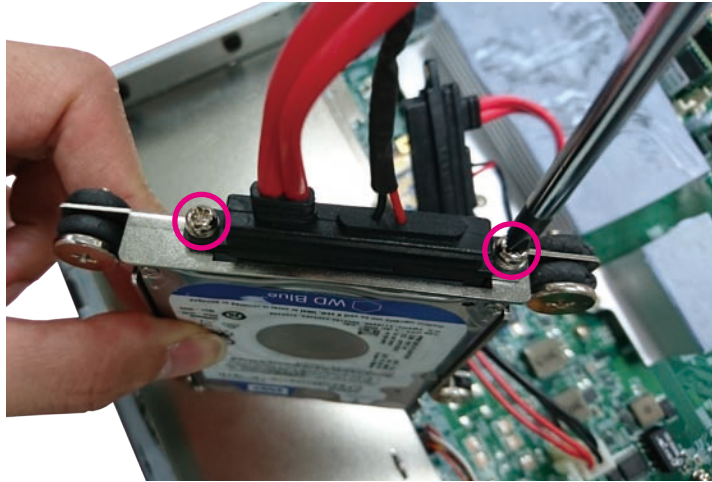
4. Secure the hard drive by fastening screws on the sides of the bracket.
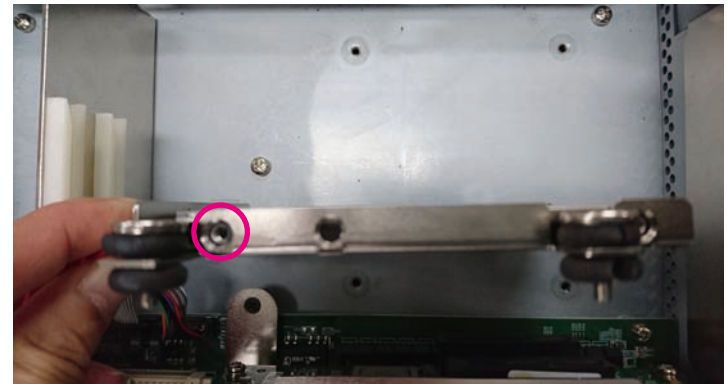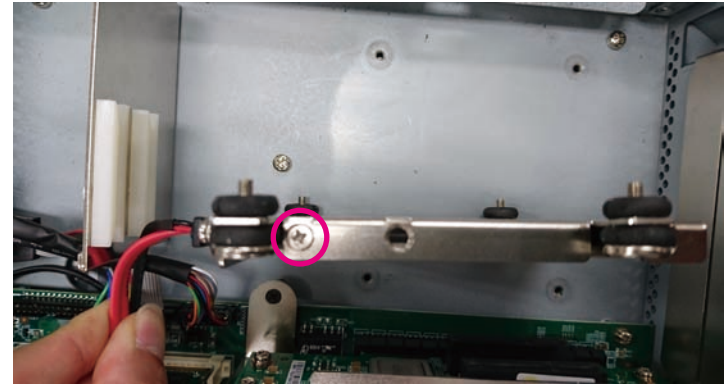
5. Secure the bracket back to its original location.

Panel Mounting

1. Select a place on the panel where you will mount the panel PC.

2. Cut out a shape on the panel that corresponds to the panel PC's rear dimensions.

   The thickness of the panel (e.g. steel board, plank, acrylic board, wall, etc.) where you will mount the Panel PC must not exceed 12mm. If the distance between the front bezel and panel mount hole is too wide, it will not fit the panel mount kit.
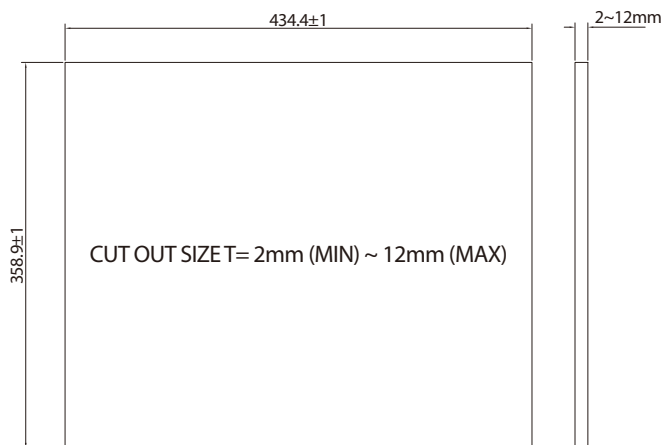
3. Slide the panel PC through the hole until it is properly fitted against the panel.

4. Position the mounting clamps along the rear edges of the Panel PC. The first and second clamps must be positioned and secured diagonally prior to mounting the rest of the clamps. Tighten the clamp's screw until it touches the panel.

CAUTION! The torque of the screw must be greater than 12kgf-cm.

434.4±1

2~12mm

358.9±1

CUT OUT SIZE T= 2mm (MIN) ~ 12mm (MAX)

CHAPTER 4: BIOS SETUP

This chapter describes how to use the BIOS setup program for the IPPC A1770T and IPPC A1770P. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NEXCOM website at www.nexcom.com.tw.

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure items such as:
- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

- This program should be executed under the following conditions:
- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.

- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the ⌨ Del key to enter Setup:

Legends

Key	Function
← →	Moves the highlight left or right to select a menu.
↑ ↓	Moves the highlight up or down between sub-menus or fields.
Esc	Exits the BIOS Setup Utility.
+	Scrolls forward through the values or options of the highlighted field.
–	Scrolls backward through the values or options of the highlighted field.
Tab	Selects a field.
F1	Displays General Help.
F2	Load previous values.
F3	Load optimized default values.
F4	Saves and exits the Setup program.
Enter	Press <Enter> to enter the highlighted sub-menu

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu
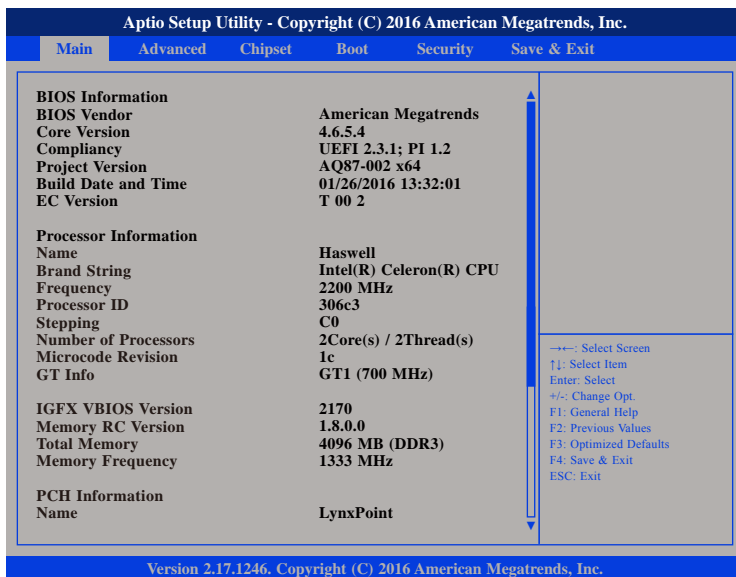
When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press Enter .

BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press Enter, to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Main    Advanced    Chipset    Boot    Security    Save & Exit

BIOS Information
BIOS Vendor                    American Megatrends
Core Version                   4.6.5.4
Compliancy                     UEFI 2.3.1; PI 1.2
Project Version                AQ87-002 x64
Build Date and Time            01/26/2016 13:32:01
EC Version                     T 00 2

Processor Information
Name                           Haswell
Brand String                   Intel(R) Celeron(R) CPU
Frequency                      2200 MHz
Processor ID                   306c3
Stepping                       C0
Number of Processors           2Core(s) / 2Thread(s)      →←: Select Screen
Microcode Revision             1c                         ↑↓: Select Item
GT Info                        GT1 (700 MHz)              Enter: Select
                                                          +/-: Change Opt.
IGFX VBIOS Version             2170                       F1: General Help
Memory RC Version              1.8.0.0                    F2: Previous Values
Total Memory                   4096 MB (DDR3)             F3: Optimized Defaults
Memory Frequency               1333 MHz                   F4: Save & Exit
                                                          ESC: Exit
PCH Information
Name                           LynxPoint

Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Main    Advanced    Chipset    Boot    Security    Save & Exit

Memory RC Version              1.8.0.0                    Set the Time. Use Tab to switch
Total Memory                   4096 MB (DDR3)             between Time elements.
Memory Frequency               1333 MHz

PCH Information
Name                           LynxPoint
PCH SKU                        Q87
Stepping                       05/C2
LAN PHY Revision               N/A

ME FW Version                  N/A
ME Firmware SKU                N/A

SPI Clock Frequency
DOFR Support                   Supported                  →←: Select Screen
Read Status Clock Frequency    50 MHz                     ↑↓: Select Item
Write Status Clock Frequency   50 MHz                     Enter: Select
Fast Read Status Clock Frequency  50 MHz                  +/-: Change Opt.
                                                          F1: General Help
System Language                [English]                  F2: Previous Values
                                                          F3: Optimized Defaults
System Date                    [Thu 03/31/2016]           F4: Save & Exit
System Time                    [18:57:47]                 ESC: Exit

Access Level                   Administrator

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```

System Language
Configures the default language of the system.

System Date
The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

System Time
The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

⚠️ Setting incorrect field values may cause the system to malfunction.

```
           Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Main      Advanced    Chipset    Boot    Security    Save & Exit

  ► CPU Configuration                              CPU Configuration Parameters
  ► SATA Configuration
  ► USB Configuration
  ► IT8769SEC Third Super IO Configuration
  ► IT8528 Super IO Configuration
  ► IT8528 HW Monitor



                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

           Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

CPU Configuration

This section is used to configure the CPU.

```
           Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Advanced

  CPU Configuration                              ▲   Number of cores to enable in
                                                     each processor package.
  Intel(R) Celeron(R) CPU G1820TE @ 2.20GHz
  CPU Signature                306c3
  Processor Family             6
  Microcode Patch              1c
  FSB Speed                    100 MHz
  Max CPU Speed                2200 MHz
  Min CPU Speed                800 MHz
  CPU Speed                    2200 MHz
  Processor Cores              2
  Intel HT Technology          Not Supported
  Intel VT-x Technology        Supported
  Intel SMX Technology         Not Supported
  64-bit                       Supported
  EIST Technology              Supported        →←: Select Screen
  CPU C3 state                 Supported        ↑↓: Select Item
  CPU C6 state                 Supported        Enter: Select
  CPU C7 state                 Not Supported    +/-: Change Opt.
                                                F1: General Help
  L1 Data Cache                32 kB x 2        F2: Previous Values
  L1 Code Cache                32 kB x 2        F3: Optimized Defaults
  L2 Cache                     256 kB x 2       F4: Save & Exit
  L3 Cache                     2048 kB      ▼   ESC: Exit

           Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

Active Processor Cores
Select the number of cores to enable in each processor package.

Limit CPUID Maximum
The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or lesser than 3.

```
          Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Advanced

  Microcode Patch            1c                      Enable or disable CPU C states
  FSB Speed                  100 MHz
  Max CPU Speed              2200 MHz
  Min CPU Speed              800 MHz
  CPU Speed                  2200 MHz
  Processor Cores            2
  Intel HT Technology        Not Supported
  Intel VT-x Technology      Supported
  Intel SMX Technology       Not Supported
  64-bit                     Supported
  EIST Technology            Supported
  CPU C3 state               Supported
  CPU C6 state               Supported
  CPU C7 state               Not Supported

  L1 Data Cache              32 kB x 2               →←: Select Screen
  L1 Code Cache              32 kB x 2               ↑↓: Select Item
  L2 Cache                   256 kB x 2             Enter: Select
  L3 Cache                   2048 kB                 +/-: Change Opt.
                                                     F1: General Help
  Active Processor Cores     [All]                   F2: Previous Values
  Limit CPUID Maximum        [Disabled]              F3: Optimized Defaults
  Intel Virtualization Technology [Enabled]          F4: Save & Exit
  EIST                       [Disabled]              ESC: Exit
  CPU C states               [Disabled]

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```

Intel® Virtualization Technology
Enables or disables Intel Virtualization technology. When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

EIST
Enables or disables Intel® SpeedStep.

CPU C States
Enables or disables CPU C States support.

SATA Configuration

This section is used to configure the SATA drives.

```
          Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
      Advanced

  SATA Controller(s)         [Enabled]              Enable or disable SATA Device.
  SATA Mode Selection        [AHCI]

  SATA1                      WDC WD5000LPLX (500.1GB)
  SATA2                      TOSHIBA MQ01AB (500.1GB)
  CFAST                      Empty
  MSATA                      Empty



                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit

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```

SATA Controller(s)
Enables or disables the SATA controller.

SATA Mode Selection
Configures the SATA mode.

IDE   This option configures the Serial ATA drives as Parallel ATA physical storage device

AHCI   This option configures the Serial ATA drives to use AHCI (Advanced Host Controller Interface). AHCI allows the storage driver to enable the advanced Serial ATA features which will increase storage performance.

RAID   This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

USB Configuration

This section is used to configure the USB.

Advanced

```
USB Configuration                                           Enables Legacy USB support.
                                                            AUTO option disables legacy
USB Module Version              8.10.31                     support if no USB devices are
                                                            connected. DISABLE option will
USB Devices:                                                keep USB devices available
        1 Keyboard, 1 Mouse, 1 Point, 2 Hubs                only for EFI applications.

Legacy USB Support              [Enabled]
XHCI Hand-off                   [Enabled]
EHCI Hand-off                   [Enabled]

USB hardware delays and time-outs:
Device reset time-out           [20 sec]
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit
```

Legacy USB Support
Enabled   Enables Legacy USB.
Auto   Disables support for Legacy when no USB devices are connected.
Disabled   Keeps USB devices available only for EFI applications.

XHCI and EHCI Hand-off
This is a workaround for OSs that do not support XHCI or EHCI hand-off. The XHCI or EHCI ownership change should be claimed by the XHCI or EHCI driver respectively.

Device Reset Time-out
Selects the USB mass storage device start unit command timeout.

IT8769SEC Third Super IO Configuration

This section is used to configure the parallel port of the third super IO.

Advanced

```
IT8769SEC Third Super IO Configuration                      Set Parameters of Parallel
                                                            Port (LPT/LPTE)
IT8785 Third Super IO Chip        IT8785 ThirdIo
▶ Parallel Port Configuration
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit
```
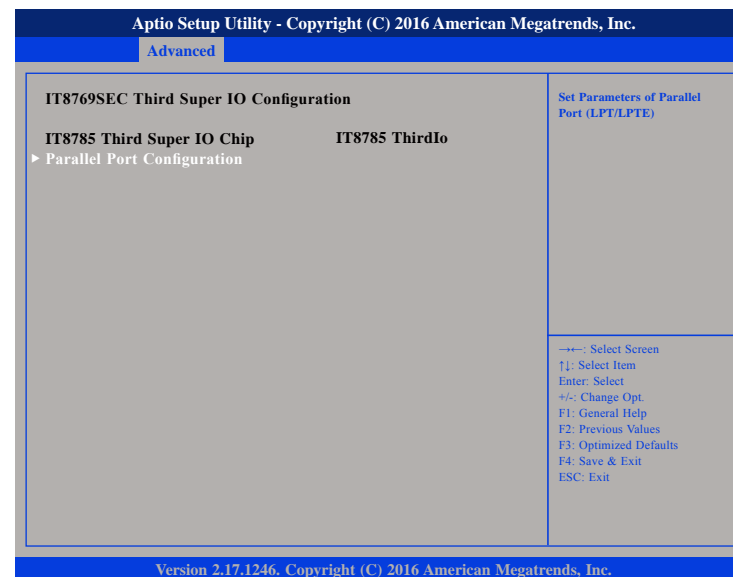
IT8785 Third Super IO Chip
Displays the Super I/O chip used on the board.

Parallel Port Configuration

This section is used to configure the parallel port.

```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Advanced

  Parallel Port Configuration                            Enable or Disable Parallel
                                                         Port (LPT/LPTE)
  Parallel Port               [Enabled]
  Device Settings             IO=378h; IRQ=5;

  Device Mode                 [Standard Parallel P...]






                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


     Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

Parallel Port
Enables or disables the parallel port.

Device Mode
Configures the operating mode of the parallel port. The options are Standard Parallel Port Mode, EPP Mode, ECP Mode, EPP Mode & ECP Mode.

IT8528 Super IO Configuration

This section is used to configure serial ports 0 and 1 of the super IO.

```
Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
  Advanced

  IT8528 Super IO Configuration                          Set Parameters of Serial Port
                                                         0 (COMA)
  IT8528 Super IO Chip            IT8528
  ▶ Serial Port 0 Configuration
  ▶ Serial Port 1 Configuration






                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


     Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

IT8528 Super IO Chip
Displays the Super I/O chip used on the board.

Serial Port 0 Configuration

This section is used to configure serial port 0.

```
             Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
     Advanced

  Serial Port 0 Configuration                                  Enable or Disable Serial Port
                                                               (COM)
  Serial Port                      [Enabled]
  Device Settings                  IO=3F8h; IRQ=4;

  Onboard Serial Port 0 Mode       [RS232]




                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


             Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

Serial Port
Enables or disables the serial port.

Onboard Serial Port 0 Mode
Select this to change the serial port mode to RS232, RS422 or RS485.

Serial Port 1 Configuration

This section is used to configure serial port 1.
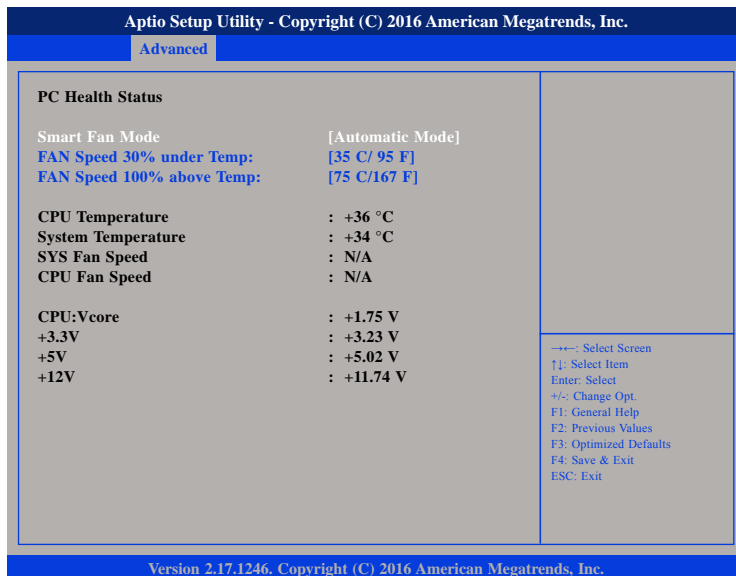
```
             Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
     Advanced

  Serial Port 1 Configuration                                  Enable or Disable Serial Port
                                                               (COM)
  Serial Port                      [Enabled]
  Device Settings                  IO=2F8h; IRQ=3;

  Onboard Serial Port 0 Mode       [RS232]




                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


             Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

Serial Port
Enables or disables the serial port.

Onboard Serial Port 0 Mode
Select this to change the serial port mode to RS232, RS422 or RS485.

IT8528 Hardware Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.

```
          Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
              Advanced

  PC Health Status

  Smart Fan Mode                  [Automatic Mode]
  FAN Speed 30% under Temp:       [35 C/ 95 F]
  FAN Speed 100% above Temp:      [75 C/167 F]

  CPU Temperature                 :  +36 °C
  System Temperature              :  +34 °C
  SYS Fan Speed                   :  N/A
  CPU Fan Speed                   :  N/A

  CPU:Vcore                       :  +1.75 V
  +3.3V                           :  +3.23 V        →←: Select Screen
  +5V                             :  +5.02 V        ↑↓: Select Item
  +12V                            :  +11.74 V       Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

Smart Fan Mode
Selects the mode of the fan, the options are Full on Mode and Automatic Mode.

FAN Speed 30% under Temp
Configures the temperature for the fan speed to operate at 30% efficiency.

FAN Speed 100% above Temp
Configures the temperature for the fan speed to operate at 100% efficiency.

CPU Temperature
Detects and displays the current CPU temperature.

System Temperature
Detects and displays the current system temperature.

SYS Fan Speed
Detects and displays the current system fan speed.

CPU Fan Speed
Detects and displays the current CPU fan speed.

VCore
Detects and displays the Vcore CPU voltage.

+3.3V
Detects and displays 3.3V voltage.

+5V
Detects and displays 5V voltage.

+12V
Detects and displays 12V voltage.

Chipset

This section is used to configure the system based on the specific features of the chipset.

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Main        Advanced      Chipset      Boot      Security      Save & Exit

▶ PCH-IO Configuration                              PCH Parameters
▶ System Agent (SA) Configuration




                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


              Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

⚠ Setting incorrect field values may cause the system to malfunction.

PCH-IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                                  Chipset

   Intel PCH RC Version          1.8.0.0              USB Configuration settings
   Intel PCH SKU Name            Q87
   Intel PCH Rev ID              05/C2

 ▶ USB Configuration
 ▶ PCH Azalia Configuration

   Restore AC Power Loss         [Power On]

   LAN1                          [Enabled]
   LAN2                          [Enabled]
   mini PCIE(CN3)                [Enabled]
   mini PCIE(CN2)                [Enabled]
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


              Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.
```

Restore AC Power Loss
Select AC power state when power is re-applied after a power failure.

LAN1 and LAN2
Enables or disables LAN1 and LAN2 controllers.

Mini PCIE (CN3 and CN2)
Enables or disables the mini-PCIe on CN2 and CN3.

USB Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.	
Chipset	
USB Configuration	Mode of operation of xHCI controller.
XHCI Mode [Smart Auto]	
Front USB **[Enabled]**	
	→←: Select Screen
	↑↓: Select Item
	Enter: Select
	+/-: Change Opt.
	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Exit
	ESC: Exit
Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.	
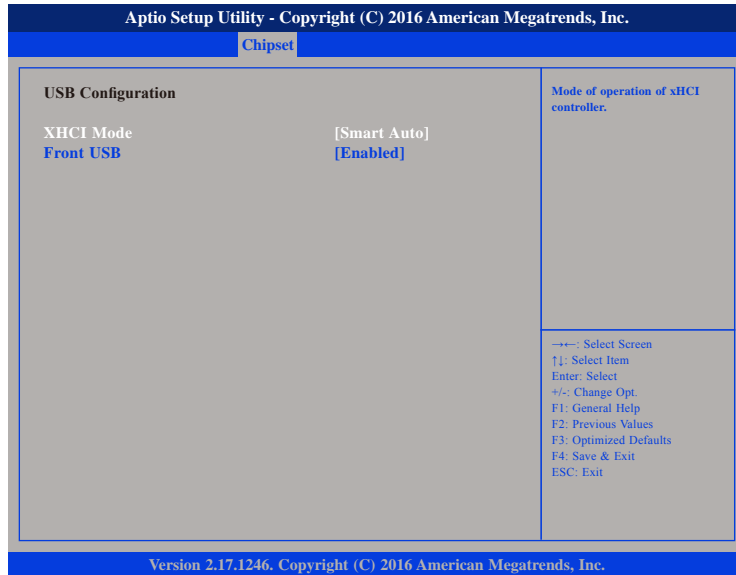
XHCI Mode
Configures the operating mode of the XHCI controller. The options are Smart Auto, Auto, Enabled, Disabled and Manual.

Front USB
Enables or disables front USB connection.

PCH Azalia Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.	
Chipset	
PCH Azalia Configuration	Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present, disabled otherwise.
Azalia [Auto]	
	→←: Select Screen
	↑↓: Select Item
	Enter: Select
	+/-: Change Opt.
	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Exit
	ESC: Exit
Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.	

Azalia
Control detection of the Azalia device.

Disabled   Azalia will be unconditionally disabled.
Enabled   Azalia will be unconditionally enabled.
Auto   Azalia will be enabled if present, disabled otherwise.

System Agent (SA) Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.		
Chipset		
System Agent Bridge Name	Haswell	Config Graphics Settings.
System Agent RC Version	1.8.0.0	
VT-d Capability	Unsupported	
► Graphics Configuration		
► NB PCIe Configuration		
► Memory Configuration		
		→←: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.		

Graphics Configuration
Enters the graphics chip settings sub-menu.

NB PCIe Configuration
Enters the NB PCIe settings sub-menu.

Memory Configuration
Enters the memory settings sub-menu.

Graphics Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.		
Chipset		
Graphics Configuration		Select which of Auto/IGFX/PEG/
IGFX VBIOS Version	2170	PCIE/SG Graphics
IGfx Frequency	700 MHz	device should be Primary
		Display Or select SG for
Primary Display	[Auto]	Switchable Gfx.
Internal Graphics	[Auto]	
DVMT Total Gfx Mem	[Auto]	
► LCD Control	[Auto]	
	[256M]	
		→←: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.		

Primary Display
Select which of Auto/IGFX/PEG/PCIE/SG graphics device should be primary display or select SG for switchable GFx.

Internal Graphics
Keep IGD enabled based on the setup options.

DVMT Total Gfx Mem
Select DVMT5.0 Total Graphic Memory size used by the internal graphics device.

LCD Control

```
             Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                              Chipset

  LCD Control                                      Select the Video Device which will
                                                   be activated during POST.
  Primary IGFX Boot Display        [LFP]           This has no effect if external
  Secondary IGFX Boot Display      [DVI]           graphics present.
  Active LFP                       [eDP Port-D]    Secondary boot display
  Backlight Dimming Control Select [Embedded Controller]  selection will appear based on
  Backlight                        [100%]          your selection.
                                                   VGA modes will be supported
                                                   only on primary display


                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit


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```

Primary IGFX Boot Display

Select the video device which will be activated during POST. This has no effect if external graphics is present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.

Secondary IGFX Boot Display

Select the secondary display device.

Active LFP

Select the Active LFP configuration.

No LVDS	VBIOS does not enable LVDS.
eDP Port-A	LFP driven by Int-DisplayPort encoder from Port-A

Backlight Dimming Control Select

Select the type of backlight dimming control to use. The available options are Embedded Controller and OS.

Backlight

Adjusts the brightness of the backlight.

NB PCIe Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.		
Chipset		
NB PCIe Configuration		Configure PEG0 B0:D1:F0 Gen1-Gen3.
PEG0	x8 Gen2	
PEG0 - Gen X	[Auto]	
PEG1	Not Present	
PEG1 - Gen X	[Auto]	
PEG2	Not Present	
PEG2 - Gen X	[Auto]	
Enable PEG	[Enabled]	
		→←: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
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PEG0 - Gen X
Configure PEG0 B0:D1:F0 Gen1-Gen3.

PEG1 - Gen X
Configure PEG1 B0:D1:F1 Gen1-Gen3.

PEG2 - Gen X
Configure PEG2 B0:D1:F2 Gen1-Gen3.

Enable PEG
Enables or disables the PEG slot.

Memory Configuration

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.		
Chipset		
Memory Information		
Memory RC Version	1.8.0.0	
Memory Frequency	1333 MHz	
Total Memory	4096 MB (DDR3)	
Memory Voltage	1.50v	
DIMM#0	Not Present	
DIMM#1	Not Present	
DIMM#2	4096 MB (DDR3)	
DIMM#3	Not Present	
CAS Latency (tCL)	9	
Minimum delay time		
CAS to RAS (tRCDmin)	9	
Row Precharge (tRPmin)	9	
Active to Precharge (tRASmin)	24	
XMP Profile 1	Not Supported	→←: Select Screen
XMP Profile 2	Not Supported	↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
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Memory Information
Displays the information on the memory installed.

Boot

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Main	**Advanced**	**Chipset**	**Boot**	**Security**	**Save & Exit**

```
Boot Configuration
Setup Prompt Timeout            1                          Number of seconds to wait for
Bootup NumLock State           [On]                        setup activation key.
                                                           65535(0xFFFF) means indefinite
                                                           waiting.
Quiet Boot                     [Disabled]
Fast Boot                      [Disabled]

Launch PXE OpROM policy        [Enabled]
Onboard LAN PXE                [Disabled]


Boot Option Priorities
Boot Option #1                 [JetFlashTranscend 2...]
Boot Option #2                 [UEFI: JetFlashTrans...]
                                                           →←: Select Screen
Hard Drive BBS Priorities                                  ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit
```

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Setup Prompt Timeout
This section configures the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

Bootup NumLock State
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Quiet Boot

Enabled	Displays OEM logo instead of the POST messages.
Disabled	Displays normal POST messages.

Fast Boot
Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Launch PXE OpROM Policy
Controls the execution of legacy PXE OpROM.

Onboard LAN PXE
Options to disable onboard LAN PXE ROM or enable it for LAN1 or LAN2.

Boot Option Priorities
Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.

Hard Drive BBS Priorities
Sets the order of the legacy devices in this group.

Hard Drive BBS Priorities

Boot	

Boot Option #1	[JetFlashTranscend 2. . .]	Sets the system boot order
Boot Option #2	[P0: WDC WD5000LPLX- . . .]	
Boot Option #3	[P1: TOSHIBA MQ01ABF. . .]	

→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
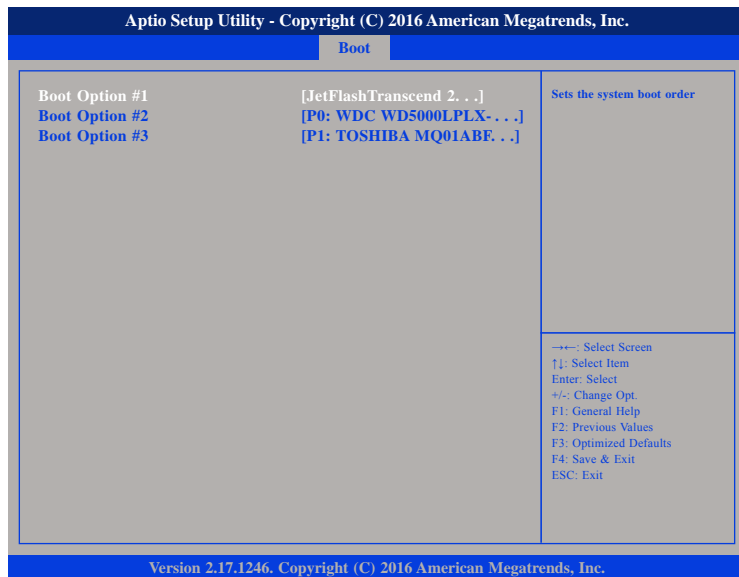
Boot Option #1 to Boot Option #3
Sets the first, second and third legacy device to boot from.

Security

Main	Advanced	Chipset	Boot	Security	Save & Exit

Password Description

If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If ONLY the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User Will
have Administrator rights.
The password length must be
in the following range:
Minimum length   3
Maximum length   20

Administrator Password
User Password

Set Administrator Password

→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Administrator Password
Select this to reconfigure the administrator's password.

User Password
Select this to reconfigure the user's password.

Save & Exit

```
          Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
   Main       Advanced     Chipset     Security      Boot     Save & Exit

   Save Changes and Exit                          Exit system setup after saving
   Discard Changes and Exit                       the changes.
   Save Changes and Reset
   Discard Changes and Reset

   Save Options
   Save Changes
   Discard Changes

   Restore Defaults
   Save as User Defaults
   Restore User Defaults
                                                  →←: Select Screen
   Boot Override                                  ↑↓: Select Item
   JetFlashTranscend 2GB 8.07                     Enter: Select
   UEFI: JetFlashTranscend 2GB 8.07               +/-: Change Opt.
                                                  F1: General Help
   Launch EFI Shell from filesystem device        F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit



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```
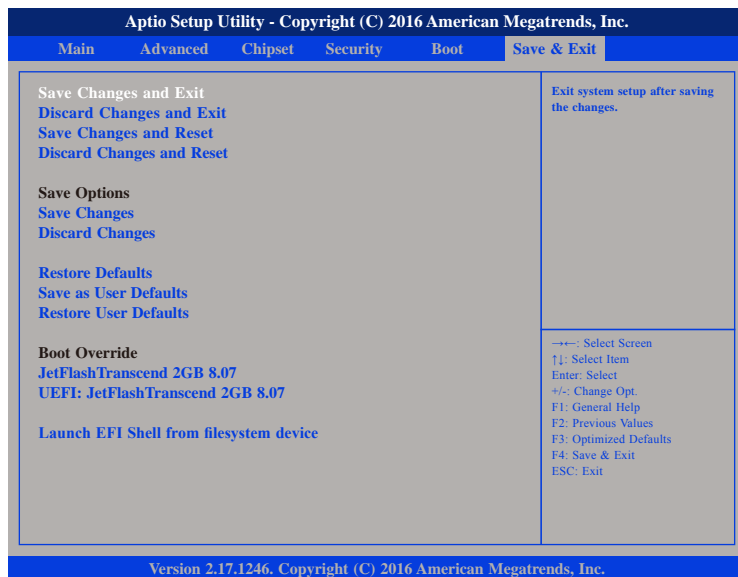
Save Changes and Exit
To save the changes and exit the Setup utility, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes. You can also press <F4> to save and exit Setup.

Discard Changes and Exit
To exit the Setup utility without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting. You can also press <ESC> to exit without saving the changes.

Save Changes and Reset
To save the changes and reset, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes and Reset
To exit the Setup utility and reset without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

Save Changes
To save changes and continue configuring the BIOS, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes
To discard the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes to discard all changes made and restore the previously saved settings.

Restore Defaults
To restore the BIOS to default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Save as User Defaults
To use the current configurations as user default settings for the BIOS, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Restore User Defaults
To restore the BIOS to user default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecing Yes.

Boot Override
To bypass the boot sequence from the Boot Option List and boot from a particular device, select the desired device and press <Enter>.

Launch EFI Shell From Filesystem Device
Launches the EFI shell.

APPENDIX A: EC COMMAND DOCUMENTATION

General Purpose of EC

ACPI defines a standard hardware and software communications interface between an OS driver and an embedded controller. This allows any OS to provide a standard driver that can directly communicate with an embedded controller in the system, thus allowing other drivers within the system to communicate with and use the resources of system embedded controllers.

Abbreviation

The Input Buffer Full (IBF) flag is set when the host has written a byte of data to the command or data port, but the embedded controller has not yet read it. After the embedded controller reads the status byte and sees the IBF flag set, the embedded controller reads the data port to get the byte of data that the host has written. After the embedded controller reads the data byte, the IBF flag isautomatically cleared by hardware. This is the signal to the host that the data has been read by the embedded controller and that the host is free to write more data to the embedded controller.

The Output Buffer Full (OBF) flag is set when the embedded controller has written a byte of data into the command or data port but the host has not yet read it. After the host reads the status byte and sees the OBF flag set, the host reads the data port to get the byte of data that the embedded controller has written. After the host reads the data byte, the OBF flag is cleared automatically by hardware. This signals the embedded controller that the data has been read by the host and the embedded controller is free to write more data to the host.

PM1 (Power Management Channel1) Overview

PWM 1 is LPC IO channel between CPU and embedded controller.
The embedded controller contains three registers at two address locations: EC_SC and EC_DATA. The EC_SC, or Embedded Controller Status/Command register, acts as two registers: a status register for reads to this port and a command register for write to this port. The EC_DATA (Embedded Controller Data register) acts as a port for transferring data between the host CPU and the embedded controller.

The status/command register is **0x66**. Data register is **0x62**. These two registers act importantly in EC controlled function.

Note: Some commands are skipped (content with "x") in RW sample code. Because RW runs under Windows 7 and with API interface to display result. For those using EC command in different OS, such as Linux or real-time OS, every command in sequence is needed for complete function command.

1. Digital I/O & EC_GPI/O

1.1 Command Register and Address Description:

Command:

Command	Description
0x80	Read
0x81	Write

Address:

Address	Description
0xA6	EC_GPI/O Register (Bit0-3 = Output, Bit4-7 = Input)
0xA7	Digital I/O Register (Bit0-3 =Output, Bit4-7 = Input)

1.2 Read Description:

This command is to read.

Sequence to read:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x80 to 0x66	Send read command	>o 0x66 0x80
2	Wait IBF clear		x
3	Write RAM address to 0x62 port	Send address 0xA6	>o 0x62 0xA6
4	Wait OBF set		x
5	Read 0x62 port	Get data in current address	>i 0x62

1.3 Setting description:

This command is to set.

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x81 to 0x66	Send write command	>o 0x66 0x81
2	Wait IBF clear		x
3	Write RAM address to 0x62 port	Send address 0xA7	>o 0x62 0xA7
4	Wait IBF clear		x
5	Write data to 0x62 port	Send data in address	>o 0x62 0x01 (Set Output H)

DIO Control

1.4 Command Register and Address Description:

EC controls DIO status by following command:

Command	Description
0x10	Write PIN number into index.
0x11	According index, get GPIO pin status. 1-active, 0-unactive, 0xFF-fail.
0x12	According index, change GPIO pin status. 1-active, 0-unactive.

Status address of DIO:

Address	Description
0x00	DI
0x04	DO

1.5 Read DIO Command Description:

Sequence to Read DIO:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x10 to 0x66	Send GPIO index command	>o0x66 0x10
2	Wait IBF clear		x
3	Write PIN number to 0x62	Write PIN number to index	>o 0x62 0x00
4	Wait OBF set		x
5	Read 0x62 port	If index setup successfully, EC will return pin number. If fail, EC will return 0xFF.	x
6	Wait IBF clear		x
7	Write 0x11 to 0x66	Send read GPIO status command	>o 0x66 0x11
8	Wait OBF set		x
9	Read 0x62 port	EC will return PIN status according to PIN number which you set in index. 1-GPIO is high. 0-GPIO is low. 0xFF-fail.	>i 0x62

1.6 Write DIO Command Description:

Sequence to Write DIO:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x10 to 0x66	Send GPIO index command	>o 0x66 0x10
2	Wait IBF clear		x
3	Write PIN number to 0x62	Write PIN number to index	>o 0x62 0x04
4	Wait OBF set		x
5	Read 0x62 port	If index setup successfully, EC will return pin number. If fail, EC will return 0xFF.	x
6	Wait IBF clear		x
7	Write 0x12 to 0x66	Send write GPIO status command	>o 0x66 0x12
8	Wait IBF clear		x
9	Write pin status to 0x62 port	Write 0x01, GPIO pin will be set high. Write 0x00, GPIO pin will be set low.	>o 0x62 0x01 (set to high)

Watchdog

1.7 Command Register and Address Description:

Command for light sensor:

Command	Description
0x89	Reset watchdog time interval
0x28	Start watchdog
0x29	Stop watchdog
0x2A	Reset watchdog

Address for watchdog:
Watchdog is used to setup time interval and also keep event status. Unit time interval is 1ms. Time setting requires a word (8 bit) long length. You can setup watchdog event time from 0 to 0xFFFFFFFE. Write 0xFFFFFFFF to time interval setting means disable watchdog event. So the interval time range is from 0ms to 497 day (0~0x0FFFFFFFE).

Address	Description
0x50-0x53	0~0xFFFFFFFE

1.8 Setup Watchdog Time Interval Description:

Sequence to read light sensor:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x89 to 0x66	Send read command	>o 0x66 0x89
2	Wait IBF clear		x
3	Write RAM address to 0x62 port	Send watchdog address 0x50~0x53.	>o 0x62 0x50
4	Wait OBF set		x
5	Write watchdog time interval value to 0x62	Values from 0~0x0FFFFFFFE, but two bit in each address, please refer to sample code explanation.	>o 0x62 0x90

Sample explanation:
To setup watchdog time interval to 4 seconds, here are the values that should be filled in each address.

4sec = 400ms (decimal) = 190 (hexadecimal)

Address	0x50	0x51	0x52	0x53
Data	0x00	0x00	0x01	0x90

Complete command set sequence:

Further Description	Command	Address	Data
Set watchdog interval, write to address 0x50~0x53 and Data "00000190"	1>o 0x66 0x89	2>o 0x62 0x50	3>o 0x00
	4>o 0x66 0x89	5>o 0x62 0x51	6>o 0x00
	7>o 0x66 0x89	8>o 0x62 0x52	9>o 0x01
	10>o 0x66 0x89	11>o 0x62 0x53	12>o 0x90

1.9 Reset Watchdog Time Interval Description:

This command is used to reset watchdog time.

Sequence to read light sensor:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x2A to 0x66	Send reset watchdog command	>o 0x66 0x2A
2	Wait OBF set		x
3	Read 0x62 port	If setup successfully, EC will return 0x03.	x (check 0x03 output on display)

1.10 Start Watchdog Description:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x28 to 0x66	Send start watchdog command	>o 0x66 0x28
2	Wait IBF clear		x
3	Write 0x01 to 0x62		>o 0x62 0x01 (check 0x03 output on display)
4	Wait OBF set		x
5	Read 0x62 port	If setup successfully, EC will return 0x01.	x (check 0x01 output on display)

1.11 Stop Watchdog Description:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x29 to 0x66	Send stop watchdog command	>o 0x66 0x29
2	Wait OBF set		x
3	Read 0x62 port	If setup successfully, EC will return 0x02.	x (check 0x02 output on display)

2. HW Monitor

2.1 Command Register and Address Description:

Command for HW monitor:

Command	Description
0x80	Read

Address for HW monitor:

| Address	Description
0xB3-0xB4	12V (MSB: 0xB3 LSB: 0xB4) (Decimal point two)
0xB5-0xB6	5V (MSB: 0xB5 LSB: 0xB6) (Decimal point two)
0xB7-0xB8	3V (MSB: 0xB7 LSB: 0xB8) (Decimal point two)
0xB9-0xBA	VCODE (MSB: 0xB9 LSB: 0xBA) (Decimal point two)
0xBB-0xBC	TEMP (MSB: 0xBB LSB: 0xBC)

2.2 Read HW Monitor Description:

This command is to read HW monitor.

Sequence to read light sensor:

Step	Action	Description	RW Sample Code Command
0	Wait IBF clear		x
1	Write 0x80 to 0x66	Send read command	>o 0x66 0x80
2	Wait IBF clear		x
3	Write RAM address to 0x62 port	Send HW monitor address 0xB3~0xC0.	>o 0x62 0xB3
4	Wait OBF set		x
5	Read 0x62 port	Get HW monitor data in current address	>i 0x62

Appendix B: Triple Display Settings

1. In the Intel® HD Graphics Control Panel menu, click **Display**.
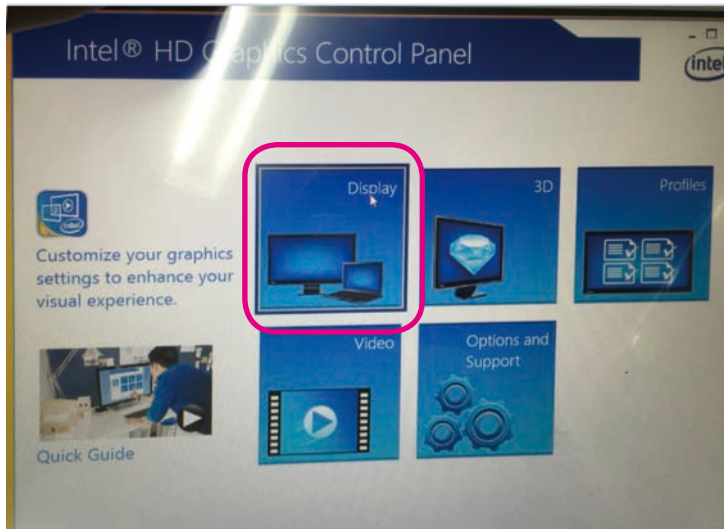
2. Click on the **Display** drop-down menu.

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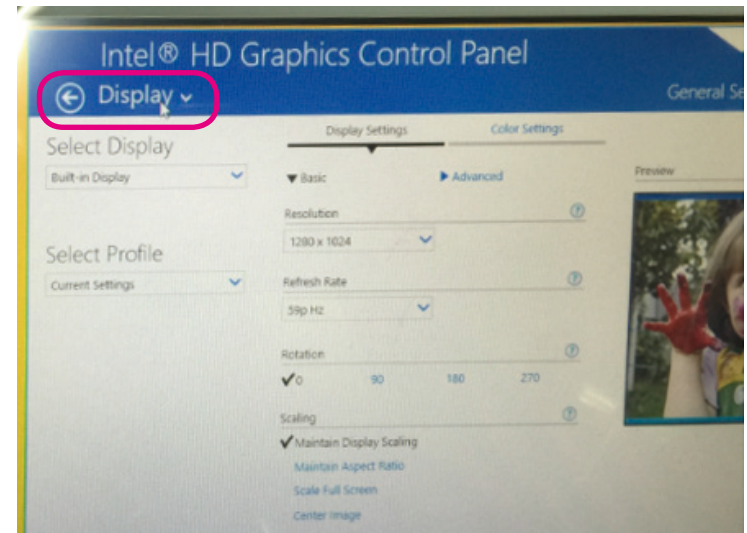
3. Select **Multiple Displays** to enter the setup screen for the three monitors.